ADVANCED TECHNOLOGY LABORATORIES-LAS VEGAS
QUALITY ASSURANCE PROGRAM PLAN

Revision 0

Effective Date: June 8, 2007

3151-3153 W. Post Road
Las Vegas, NV 89118
PHONE: (702) 307-2659
FAX: (702) 307-2691

Laboratory Director/
President: _____ Date: 6/8/07
Puri Romualdo

QA Manager: _____ Date: 6/8/07
Glen Gesmundo

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1 QUALITY ASSURANCE ORGANIZATION

1.1 OVERVIEW

ADVANCED TECHNOLOGY LABORATORIES-LAS VEGAS (ATL-LV), a division of Environmental Treatment and Technology, Inc., (ETT), is a full service analytical laboratory, which provides technical and laboratory support for commercial and regulatory agencies. Clientele include consulting, engineering firms, city/local, various state agencies, and others clients requiring analytical services.

It is the purpose of this document to describe ATL-LV's program to assure that analytical data generated by ATL-LV are of a known quality and a known level of confidence.

1.2 QUALITY ASSURANCE POLICY AND OBJECTIVES

ATL-LV is committed to provide the client with analytical data of a known and documented quality sufficient to meet its data quality objectives in a reasonable time frame and at a fair cost. The reliability of the data generated by ATL-LV is measured by the close adherence to quality control, qualifications and experience of personnel, and the organization's commitment in maintaining data integrity, validity, and usability.

The following statements describe the quality of the data required to be usable for the client.

1.2.1 Data Quality Objectives (DQOs)

Data quality objectives are used to assess the minimum data quality to ensure that the amount, type, and quality of data obtained during analytical processes are adequate to support and draw valid conclusions with a known level of confidence. DQOs also support specific decisions, and planning relative to remedial and regulatory actions.

The data quality objectives process facilitates the determination of the following:

1.2.1.1 Information and data requirements for the specified project.

1.2.1.2 Where, when, and how to collect samples to allow the most precise measurements as possible.

1.2.1.3 Laboratory Quality Assurance/Quality Control required to defend the data quality.

1.2.1.4 Required number of observations.

1.2.2 DQOs are usually expressed in terms of:

1.2.2.1 Precision

It is defined as the degree to which a set of observations or measurements of the same property obtained under similar conditions conform to themselves; a data quality indicator. Precision is usually expressed as standard deviation, variance or range, in either absolute or relative terms.

1.2.2.2 Accuracy

It is defined as the degree of agreement between an observed value and an accepted reference or true value. Accuracy includes a combination of random error (precision) and systematic error (bias) components which are due to sampling and analytical operations; a data quality indicator. Accuracy may be assessed through the use of blanks, known quality control (QC) samples, and matrix spikes.

1.2.2.3 Representativeness

It is the degree to which data accurately represent a particular characteristic of a population or environmental parameter. It is a qualitative parameter that is most concerned with the proper design of the sampling program.

1.2.2.4Comparability

It measures the confidence in comparing results in one experiment with the results of the same experiment on different samples. It is also demonstrated through the participation in round-robin performance evaluation studies and the use of standard reference materials that are traceable to the National Institutes of Science and Technology (NIST) and EPA.

1.2.3 Quality Assurance/Quality Control (QA/QC) Program

ATL-LV's QA/QC program ensures that analytical measurement systems are maintained within acceptable limits and reproducibility. Specific sections of this QA/QC plan address various QA/QC procedures that are used to generate valid and defensible data. Some elements of the QA/QC program include:

1.2.3.1 Preventive Maintenance

All analytical instruments and equipment are checked and calibrated by the analyst each time the instrument or equipment is used. In addition, the instrument or equipment is rechecked and recalibrated depending on the usage either on a time basis or sample basis according to the Standard Operating Procedures (SOPs). Besides daily checks, a schedule of preventive maintenance is kept to reduce the likelihood of total failures. Instrument calibration and precision statistical records are kept to insure stability and reproducibility.

1.2.3.2 Quality Assessment Procedures

ATL-LV employs quality assessment procedures to detect problems through data assessment and establish corrective action procedures that keep the analytical process reliable. Data validation is accomplished at all levels. Data reporting procedures start at the laboratory bench level. Supervisors, QA Officer, and Laboratory Director and/or his designated signatory personnel do the review of the final data package report.

1.3 ORGANIZATION AND PERSONNEL

1.3.1 Organization

Appendix A shows the organizational structure of the analytical services within Advanced Technology Laboratories-Las Vegas. Appendix B shows a table of Key Personnel along with their assignments, responsibilities, education, and years of applicable experience.

1.3.2 QA/QC Roles and Responsibilities

Specific QA/QC responsibilities are summarized as follow:

1.3.2.1 President

The President has the overall responsibility for the general operations of ATL-LV, including but not limited to Administration, Business Office, Regulatory Affairs, and Technical Operations.

1.3.2.2 Laboratory Director

The Laboratory Director is directly involved in the day-to-day operation such as scheduling, staff training, QAPP implementation, technical peer

reviews, etc. of their respective group. In the absence of the Laboratory Director, the QA officer will temporarily perform the duties and responsibilities of the Laboratory Director. The Laboratory Director is responsible for:

- Enforcing the QA/QC procedures and requirements within the laboratory.
- Ensuring that sufficient numbers of qualified personnel are employed to supervise and perform the work of the laboratory.
- Recommending process improvements and corrective actions.
- Maintaining an environment that emphasizes an intelligent and responsible approach to producing high data quality and accuracy based on the SOPs carried out.
- Performing annual management review to evaluate suitability and effectiveness of quality system and make necessary changes or improvements.

1.3.2.3 Quality Assurance Officer (QA Officer)

The QA Officer reports directly to the President and is responsible for all matters on laboratory quality assurance. Specific roles include:

- Responsible for implementation and monitoring of the laboratory quality assurance program.
- Ensuring that all data generated is scientifically sound, legally defensible, and of known precision and accuracy.
- Monitoring the QA plan on a periodic basis to ensure compliance with the QA objectives of the laboratory.
- Developing and implementing new QA procedures within ATL-LV to improve data quality.
- Conducting audits and inspections of all departments on a periodic basis; reporting the results of the audits to the General Manager, Laboratory Director, and Supervisors; and implementation of corrective actions to ensure compliance with the QA plan.
- Coordinating the analysis of performance evaluation (PE) samples for

all analytical departments on a periodic basis.

- Evaluating the results; reporting the results to the President, Laboratory Director, and appropriate Supervisors; and applying corrective actions as needed.

- Establishing and maintaining statistical and data records that accurately reflect the quality assurance performance of all analytical departments.

- Maintaining and overseeing the master sources of all SOPs, training logs, and completed/full laboratory notebooks.

- Serving as the in-house client representative on all projects inquiries involving data quality issues.

- Maintain and update the QA Program Plan on an annual basis (minimum).

1.3.2.4 Laboratory Supervisor(s)

The Laboratory Supervisors are directly involved in the day-to-day such as scheduling, supervision of laboratory procedures and reporting of results, staff training, etc. of their respective departments. In the case of absence of both Laboratory Director and QA Officer, the Department Supervisors will perform the duties and responsibilities of the job. The Laboratory Supervisors are responsible for:

- Enforcing the QA/QC procedures and requirements within their respective activities and areas of specialization.

- Monitoring validity of the analyses performed and data generated in the laboratory to assure reliable data.

- Supervising the staff training in the procedures described in the standard operating procedures (SOPs) as they apply to the assigned responsibilities of the staff.

- Recommending process improvements and corrective actions.

1.3.2.5 Project Coordinators (PC)

The Project Coordinator has the overall responsibility for the technical completeness, cost control, and adherence to schedules. Specific

responsibilities include:

- Implementing the appropriate quality procedures for project activities in support of the QAPP.
- Communicating with the Laboratory Director and/or QAO relating to QA/QC activities.

1.3.2.6 Sample Control Officer

The primary responsibility is to manage the sample control section. The Sample Control Officer is responsible for overseeing sample log-in, proper documentation, sample tracking, sample storage, sample disposal/return, and coordination and scheduling of sampling programs. Other responsibilities include client contact, and assists with contract administration.

1.3.2.7 Document Control Officer

The Document Control Officer is responsible for the filing, retrieval and storage of all documents.

1.3.2.8 Staff (Chemists, Technicians and Support Personnel)

Every ATL-LV laboratory personnel are responsible for the quality of work that is consistent with the requirements established by the ATL-LV management. The laboratory personnel plays an active role in the ATL-LV Laboratory quality program and whenever possible, make recommendations regarding the process improvements and corrective actions. Specific job descriptions are available in the Human Resource File.

The ATL-LV personnel responsibilities include but not limited to:

- Providing the management and the QAO with the immediate notifications of the quality problems by submitting Non-Conformance forms.
- Identifying and carrying out the approved corrective actions within their respective activities and specialization.
- Participating in the training program (including reading SOPs and QA Manual, MDL determinations and Accuracy and Precision data).

- Following QA/QC criteria for all program requirements.
- Correct reporting of sample results and QC samples.

1.4 PERSONNEL TRAINING

The ATL-LV training program is designed to ensure that all personnel are qualified and properly trained to perform all required tasks. The training program also provides that all pertinent health and safety issues are covered on a quarterly basis. It also provides for periodic evaluation of each staff member's skills by performance evaluation samples.

Initial training includes reading and understanding the method, Standard Operating Procedure (SOP) comprehension, standards preparation, method set-up, accurate reporting, correct and accurate QA/QC and routine instrument maintenance. Trainees are given supervised training by the department supervisor or by designated chemist(s) who already completed the initial proficiency. Once the initial training is complete, the chemist's initial proficiency demonstration can be determined from accuracy and precision data, testing of the SOPs, and demonstration through performance evaluation (PE) samples. All results are documented into the personnel training log by the QA Officer.

The QA Officer conducts internal "blind" performance evaluation samples as part of the training program. These "blind" performance evaluation samples are submitted to the analyst after the initial training has been completed and on an annual basis (more frequent if necessary). All results from the internal performance evaluation samples are evaluated for accuracy. The results are graded on a "PASS/FAIL" system. All analytes that "fail" must have a corrective action and a subsequent sample will be re-submitted.

The chemist must also submit "Accuracy and Precision" data by preparing and analyzing 4 replicate reference samples containing target analytes in a clean matrix. The accuracy and precision data is calculated from 4 Laboratory Control Samples (LCS) that are spiked with a secondary source standard. The results are evaluated for accuracy (average recovery) and precision (standard deviation of the recovery). The results are evaluated against method or in-house limits. If the data does not meet the criteria, then a corrective action is initiated. Once the problem is corrected, a new precision and accuracy data set is collected and evaluated. All forms and raw data is filed in the training log.

As part of the chemist's training, each chemist and technician must read the QA Manual whenever there is a revision to the manual. Each chemist must answer some questions and sign the questionnaire as documentation to reading the QA Manual. The questionnaire also allows the chemist to ask questions and give updates for the next revision.

Continuing (supplemental) training includes development of SOPs, learning the importance of documentation, the understanding of meeting QA/QC criteria and quality. Supplemental training can be obtained from reading different procedures, instrument manuals and related literature. Knowledge regarding methods and instrumentation can also be obtained from external training by agencies and manufacturers. Copies of completion certifications are kept in the chemist's training file.

The QA Officer maintains the training records. At least once a year, all employees' training records are updated to reflect current training qualifications. Documentation of continuing proficiency by at least one of the following are kept on employees' training record: (a) Acceptable performance of a blind sample; (b) Another demonstration of capability; (c) Successful analysis of a blind performance sample on a similar test method using the same technology; (d) Analysis of at least 4 consecutive lab control samples with acceptable levels of precision and accuracy; or(e) If one of the above cannot be performed, the analysis of authentic sample that have been analyzed by another trained analyst with statistically indistinguishable results.The oversight of the training program is performed by the QA Officer, the department supervisors, and the Laboratory Director.

According to ATL-LV's Employee Handbook, under section "Personal Conduct", disciplinary action, which may include discharge, will be taken for offenses such as: falsifying data and/or company records, violation of safety rules, breach of security and/or confidentiality, commitment of financial or legal resources without authorization of company officer." When a new employee begins work at ATL-LV, they are required to read the Employee Handbook and an "Ethics and Data Integrity Agreement". Each document requires the employee to sign an acknowledgement memo stating that they have read and understood each item that was submitted to them.

On a continuing basis, ATL-LV employees will receive ethics and data integrity training on a minimum frequency of once per year. Copy of training materials will be provided to the employees for reference. Attendance sheet will be required to acknowledge receipt of training.

2 FACILITIES AND EQUIPMENT

2.1 LABORATORY LAY-OUT

The laboratory is strategically situated in a commercial business complex and occupies 2 suites all together. ATL-LV is located at 3151 W. Post Road, Las Vegas, Nevada, 89118. See Appendix C for Laboratory Layout.

2.2 MATERIAL PROCUREMENT AND CONTROL

2.2.1 Supplies Management

To assure the quality of supplies used for various laboratory analyses, the following items are taken into account (Refer to SOP for Material Procurement for more details):

2.2.1.1 Materials, reagents, standards, solvent, and gases are carefully selected to meet specifications defined in the method analyses. Each new supply of these items are verified for their performance capabilities, freedom from impurities that interfere with the analysis, and background levels measured to check the degree of contamination.

2.2.1.2 Materials are dated upon receipt to establish their order of use, "as first in, first out basis," and to minimize the possibility of exceeding their shelf-life. Pertinent information such as name of supplier, lot number, expiration date, concentration, date opened, date received, and date expired into the chemical inventory logbook. Chemicals are then labeled with a chemical inventory code, date received, date opened, and date expired sticker.

2.2.1.3 Stock and working standards solutions are prepared fresh as often as required by their stability. These are checked for signs of deterioration (e.g., formation of precipitates, discoloration, and changes of concentration through calibration results). Standard solutions are properly labeled as to name of solution, concentration, solvent, date of preparation, and initial of who prepared. Standard preparation is documented in the standard preparation logbook. The standards are stored in places where these are protected from degradation and contamination.

2.2.1.4 Acids and bases are segregated in terms of storage. Various types of solvents are stored in flammable storage cabinets. Dry chemicals used for inorganic and organic analyses are stored in the chemical storage cabinet. Incompatible chemicals should not be stored together for safety reasons. Primary standards and working standards prepared for organic analysis are stored in the standard refrigerator/freezer.

2.2.1.5 Services such as electricity, air, gas, and vacuum are checked for proper specifications for efficient and reliable performance of the instruments.

2.2.1.6 Blank or clean water for volatile and semi-volatile organics is purchased from a commercial water distributor. Deionized or nanopure water for inorganic analyses are obtained from a commercial water demineralizer. The laboratory conducts daily checks of the reagent water by monitoring conductivity. The conductivity must be equal to or less than 1 μmho/cm.

2.2.2 Subcontractors

Samples can be subcontracted to another laboratory, if ATL-LV is not approved to perform a particular test or if the lab is not able to complete analysis of required tests. The client will be advised in writing by the Project Coordinators of its intention to sub-contract any portion of the testing to another party. These samples must be subcontracted to an approved outside laboratory.

All data from subcontract laboratories must meet all project requirements. Samples must be re-analyzed if specified project requirements are not met. The final report is reviewed for typographical and technical errors.

2.2.3 Equipment Management

Information on the actual performance of the equipment is obtained before purchase request for a piece of equipment is made. The availability of the supplier's service to install and test it against specifications as part of purchase price is also considered. When first installed, an internal calibration of the instrument is performed using the manufacturer's manual. Analytical reference standards are analyzed for qualitative and quantitative checks on the instrument performance during the sample run. Routine preventive maintenance of the instruments/or equipment is done on a regular scheduled basis.

Equipment that has been subjected to overloading or mishandling, gives suspect results, or has been shown to be defective or outside specified limits, shall be taken out of service. It must be clearly labeled or marked “Out of Service”, until it

has been repaired and known by calibration or test to perform correctly. All corrective action done on the instrument must be recorded on the maintenance logbook as well as proof of conformance.

2.2.4 List of Instrumentation - Appendix D lists the various instrumentation and equipment.

2.2.5 Preventive Maintenance Activities and Schedules

Instruments are maintained according to the Standard Operating Procedures using the manufacturer documentation. Repairs are conducted as needed, either by manufacturer representatives or by in-house personnel. Routine maintenance (lamp replacement, etc.) is conducted as needed to maintain instrument integrity.

Critical equipment and instrumentation are maintained on a scheduled basis to minimize the downtime of measurement systems. Maintenance logbooks (hard bound) are kept for each equipment. All maintenance (routine and unscheduled) is recorded by the analyst. Each entry must contain at the minimum: date, event/problem, corrective action, proof of conformance, and initials.

2.2.6 Waste Disposal

Laboratory generated wastes are classified into various waste streams and are disposed according to the local, state, and federal regulations.

2.3 LABORATORY RESOURCES

When large or new projects are scheduled to arrive at the laboratory, the project coordinator or client service person should request all pertinent sample information from the client. This includes methods to be used, number of sample(s), matrix types, QC requirements like MDL, PQL and control limits, turn-around-time, data package requirements and expected sample delivery schedule.

A meeting of all key personnel is called to distribute the sample information for the project. The current accreditation status of the laboratory must be reviewed against requested analyses. Allocation of personnel, laboratory resources and materials are distributed for the type of work and the expected turn-around-time. The laboratory must inform the client thru the project coordinators the results of this review if it indicates any potential conflict, deficiency, lack of appropriate accreditation status, or inability on the

laboratory's part to complete or meet client's requirements. Any work that will be subcontracted by the laboratory will also be communicated to the clients.

Any differences between the request or tender and the contract shall be resolved before any work commences. Each contract shall be acceptable both to the laboratory and the client. If a contract needs to be amended after work has commenced, the same contract review shall be repeated and any amendments shall be communicated to all affected personnel.

Records of reviews shall be maintained as well as pertinent communication/discussion with clients by means of e-mails or phone logs.

3 SAMPLING HANDLING AND CHAIN-OF-CUSTODY (COC)

3.1 SAMPLE COLLECTION

Sampling is done by outside contractors mostly by clients, i.e., environmental engineering consultants, and government contractors.

3.2 SAMPLE PREPARATION

ATL-LV prepares all sample containers, including trip or transport blanks, and used according to the requirements stated in 40CFR, Part 136, Guidelines Establishing Test Procedures for the Analysis of Pollutants. Sample holding time, preparation, and analyses follow the specified method requested for analysis.

3.2.1 For volatile sample analysis, an aliquot of the solid sample is taken first for analysis. The remaining samples are then prepared for the rest of the required parameters. A separate vial or container with zero headspace is used for liquid samples

3.2.2 The frequency of QC samples within a given batch of a similar matrix is defined in the project QA/QC requirement. Specific QA/QC criteria for the QC samples such method blanks, matrix spike/matrix spike duplicate, laboratory control sample, field blank, etc. are defined in the method used for analysis and/or the project QA/QC requirement.

3.3 SAMPLE TRACKING

Samples received at ATL-LV are considered as physical evidence and are handled according to the procedural safeguards established by EPA.

3.3.1 Standard Operation Procedure (SOP)

The Sample Control Login SOP describes in detail how samples are received, the step-by-step sample log-in process, how samples are tracked from receipt to completion, and the overall responsibilities of the Sample Control Officer.

3.3.2 Sample Verification

A sample custodian receives a sample shipment or delivery. An alternate person is designated to receive samples if the Sample Control Officer is not available. The following procedures are taken during the process.

3.3.2.1 Coolers should be opened under a fume hood, wearing the appropriate personal protection equipment.

3.3.2.2 The cooler temperature is taken and recorded on the project folder. The acceptance criteria for the cooler temperature are 2 - 6 degrees Celsius.

3.3.2.3 Presence or absence of custody seals or tape on the shipping containers and the condition of the seals (i.e. intact, broken, etc.) are noted on the chain of custody.

3.3.2.4 If the COC is not available with the samples, a Sample Control Personnel or Client Service person must call the client to request the COC.

3.3.2.5 The COC accompanying the samples is signed and dated. A copy of the COC is kept in the project folder.

3.3.2.6 The Sample Control Personnel must check agreement between client's sample labels, ATL-LV's labels and COC. If there are any discrepancies, then client must be notified immediately of any problems.

3.3.3 Sample Login

3.3.3.1 Login begins with assigning an ATL-LV Laboratory workorder number from ELIMS (Environmental Laboratory Information Management System). This is an eight digit sequential text and numeric combination that identifies the samples.

- Within each workorder, the samples are given an individual number starting at 001A. A sample is defined as a unique client ID and unique bottle/preservation. A workorder with 10 samples will be labeled as NV001001-001A / 010A.

- For those samples that have the same client ID and a unique bottle/preservation must have a individual fraction assigned to each bottle. A sample with 3 fractions will be labeled as NV001001-001A / 001C.

- For VOA vials, the ELIMS will assign multiple containers with 1 of 2, 2 of 2, etc.

3.3.3.2 A Master Sample Log is generated from the ELIMS. This contains the following information for every set of samples received: client name, project name, date of collection and receipt, matrix of the samples, the analyses requested, client sample ID, preservation, container type, due date, selected analyte list, initials of Sample Control personnel and Status (Turn-Around-Time). The log is printed out every day and is placed into a 3-ring binder. The log is then permanently bound with 5 days after the quarter ends. All old logbooks will be stored in the QA Office.

3.3.3.3 Other login information includes: information for specific sample handling, QA/QC, detection limits are documented in the "Comments" section of the sample login of ELIMS.

3.3.3.4 A sample-receiving checklist is filled out on the ELIMS. The checklist documents the carrier name, cooler temperature, shipment/sample condition questions and Sample Control personnel initials. A printout of the checklist is placed into the project folder.

3.3.3.5 A project folder is created for each WorkOrder. A WorkOrder COC generated by ELIMS is printed and placed into the plastic sleeve at the front of the project folder. Also , a printout of the WorkOrder Summary is placed inside the project folder for the Project Coordinator review.

3.3.4 Sample Labeling

After the samples have been logged into the ELIMS, a sample label is printed with the client ID, ATL-LV laboratory number, date received and the barcode. The label is then affixed to the appropriate container.

3.3.5 Chain of Custody (COC)

Chain-of-custody procedures are used for a variety of samples in the laboratory. The purpose is to establish a detailed documentation of all transactions in which the samples are transferred from the custody of one individual to another. These procedures are used from the point at which the samples are collected to the opening of the samples in the laboratory, and the subsequent disposition of unused samples. A COC form documents sampling efforts and sample transfer from the field to a testing facility or between testing facilities. An example of an ATL-LV chain-of-custody form is shown in Appendix E.

3.3.6 An ATL-LV COC form is used for a set of samples received without a client's COC or equivalent form. It is used to document any sampling and analysis information contained on the sample label or as provided via FAX or mail by the client.

3.3.7 If samples need to be sent out to a subcontractor, a new ATL-LV COC form, cross-referencing the original COC, is generated to accompany samples delivered outside the laboratory.

3.3.8 The traceability of the samples that are transferred to or from the laboratory is tracked by the use of the ATL-LV laboratory number (batch) and client sample identification. These are monitored from the point of acquisition by the laboratory through the sample preparation, analysis, data reduction, data validation, final report generation, and sample disposal.

3.3.8.1 Sample traceability throughout the laboratory is achieved by using the ELIMS Sample Tracker.

- When the samples are given to the chemist, ELIMS records the date, time, samples, the name of the chemist the samples were transferred to and the Sample Control personnel initials.
- When samples are transferred to Sample Disposal, ELIMS records the date, time, samples, transfer location and the Sample Control personnel initials.
- Samples that are consumed, broken, disposed or returned to the client are recorded by ELIMS with the date and time of the transaction.

3.3.8.2 In the Sample Preparation Areas, sample traceability is documented on the organic extraction and metal digestion logbooks. After the samples have been prepared, the extractor or digestor gives the extracts and an extraction printout from ELIMS to the analyst.

3.3.8.3 Sample traceability continues through the analysis, data reduction, data validation, final report generation, and sample disposal by the use of the ATL-LV laboratory number. All result templates, folders, invoices, and final reports document the ATL-LV laboratory number for all samples.

3.4 SAMPLE STORAGE

3.4.1 For Samples

Samples received by the laboratory are placed into 2 laboratory refrigeration units, which are restricted to authorizelaboratory personnel. Samples for volatile analysis are kept in a separate refrigerator. The temperature of the refrigerators is monitored for the acceptable temperature range.

3.4.1.1 Acceptable refrigerator temperature range is $\leq 6\ ^{\circ}C$.

3.4.1.2 Temperature of the sample storage refrigerators is monitored daily for acceptable working temperature range using an NIST traceable thermometer. The thermometer is calibrated against an NIST reference thermometer every twelve months. (See Section 6.1.2 for more details.)

3.4.1.3 The SOP for Thermometer Calibration describes the calibration of thermometers. Electronic thermometers are rechecked daily to confirm the stability of the calibration.

3.4.1.4 Corrective actions are taken if the refrigerators malfunction or the temperature is out of acceptable range. A Non-Conformance Form is submitted to the QA Officer following the corrective action.

3.4.1.5 If a client submits samples to the laboratory, which could or/will, go to litigation, the laboratory can make provisions to store the samples into a separate refrigerator. The refrigerator can be locked and secured until a written notice is received from the client. The client must approve transferring or disposal of samples. A written authorization must be faxed to the laboratory confirming status of samples. All documentation must be placed into the project folder.

3.4.2 For Extracts, Digestates and Leachates

Once the sample has been processed, the extract, digestate or leachate must be stored according to method specified conditions. The digestates for metals are stored at room temperature until sample analysis. The digestates for mercury are analyzed on the same day as the digestion. Organic extracts can be stored up to 40 days at 4 ° C(± 2 °C). The extracts must be stored in a separate refrigerator from that housing the analytical standards. The leachates (from tests such as TCLP) can be stored prior to the preparation stage or the analytical stage. Each has a holding time and/or preservation requirements. See method for details.

3.5 SAMPLE DISPOSAL

Unused and remaining portions of the samples received in the laboratory are kept for at least 45 days upon receipt (or as stated by the project requirements). A sample disposal fee is charged if client prefers the laboratory to dispose them. Laboratory sample disposal is in accordance with the local, state, and federal regulations.

Laboratory waste is segregated according to hazard class. Non-hazardous waste is disposed of in one of two ways: non-hazardous aqueous waste is neutralized and disposed with excess water. Non-hazardous soil samples are disposed of in the regular trash.

Hazardous wastes are segregated by organic and inorganic type material. This material is packaged in steel drums. Oil samples are also segregated into steel drums for recycling. Waste solvents and solvent-based extracts are stored in steel drums for recycling. A licensed disposal company performs all handling of hazardous waste.

3.6 SAMPLE CONTAINERS PREPARATION

To ensure sample integrity, steps are taken to minimize contamination from the containers by lot analyses verification of cleanliness. If the analyte(s) to be determined is organic in nature, the preferred container is made of glass. If the analyte(s) is inorganic, then the container is plastic. Sample containers supplied to the clients are either commercially obtained as pre-cleaned containers or verified clean by ATL-LV lab analyses. Certificate of analysis is accompanied with the various types of sample containers purchased commercially.

The laboratory provides chemical preservation in sample containers for clients requesting containers ahead of time before collection.

4 DOCUMENT CONTROL

A document control program is established to ensure that all documents issued or generated at ATL-LV are accountable and traceable. Listed below are the general guidelines of the document control program.

4.1 LOGBOOKS/NOTEBOOKS

4.1.1 Documentation Policy

The general guidelines for documentation of any records or entries are:

4.1.1.1 Legibility: All entries must be legible. Printing is preferable, but writing is acceptable for all characters, including notes.

4.1.1.2 Recording Entries: All entries are made using indelible ink pens, preferably blue or black.

4.1.1.3 Review all forms before entering information.

4.1.1.4 The originator(s) of all entries must be identified by initial(s) or signature(s). In most cases, there are specific places on the data sheet for initials to identify the originator of entries or groups of entries.

4.1.1.5 All blanks with no data must contain a diagonal line or "Z" out and initialed and dated.

4.1.1.6 The use of abbreviations is kept to a minimum. Only nationally accepted abbreviations (e.g., mg/Kg, mL, µg/Kg) and chemical formula abbreviations (e.g., NaOH, HCl) may be used without further clarification. Other abbreviations can be used providing the abbreviation can be traced to the corresponding abbreviation explanation.

4.1.1.7 All mistakes are corrected at the time the error is discovered. Cross out with a single line so as to remain legible. **Do not** erase, write over, or use correction material. Each cross out is initialed and dated. If the reason for the change is not obvious, then the reason must be stated.

Note: If there is insufficient space for all or part of the correction information, enter a footnote call out near the incorrect data and enter the required information as a comment elsewhere on the data sheet, notebook page, etc.

4.1.1.8 The cover of each notebook is identified with subject identification (instrument, method, procedure, etc). All analysts making entries in the book are required to print their names with corresponding initials and signatures in the second page of each logbook. All documentation entered must be clear, legible and detailed. Each entry must be dated by month, day and year in which the data were recorded and signed by the person performing the work or entering the data.

4.1.2 Logbook Maintenance and Archiving Procedures

4.1.2.1 Analyst Notebooks: Each analyst maintains a personal bound notebook. The analyst is able to keep notes during training sessions. Whenever the analyst's logbook becomes full, it is the analyst's responsibility to get a new replacement logbook from the QA Officer. These logbooks are subject to audits.

4.1.2.2 Instrument Maintenance Logbooks: Each instrument must have an associated logbook to record maintenance (routine and unscheduled) and repairs. These logbooks are audited for complete entries during inspections. The logbook is replaced and archived by the QA Officer. The maintenance logbooks are archived for 5 years.

4.1.2.3 Standard and Extraction Logbooks are required to keep records of standard traceability and sample preparation. These logbooks are audited for completeness, standard traceability, standard preparation, correct QC sample batching, etc. The logbooks are replaced and archived by the QA Officer. The Standard and Extraction Logbooks are archived for 5 years.

4.1.2.4 Injection run logbooks are used to record the sequence of the sample run, corresponding standards with standard codes and corresponding QC samples. The runlogs are replaced and archived by the QA Officer. The runlogs are archived for 5 years.

4.1.2.5 ATL-LV Sample Login Logbook: The logbook is used to record the unique ATL-LV sample identification, date sampled, turn-around-time, project, matrix type, client, client's sample identification, test, preservation, bottle type, and initials of login personnel. The logbook is audited for completeness during inspections. The logbook is archived by the QA Officer. The Sample Login logbooks are archived for 5 years.

4.1.2.6 Miscellaneous Logbooks: Refrigerator temperature log, balance check log, distilled water check, etc. are used to record various laboratory equipment. The logbooks are audited for daily monitoring and

completeness. The logbooks are replaced and archived by QA Officer. The logbooks are archived for 5 years.

4.1.2.7 An Access database has been developed to record the name of the logbook, notebook code identification, department, and type of logbook, log number, date of issue, archival date and number of box where the logbook was kept. This will allow easy retrieval of logbooks when needed.

4.2 STANDARD OPERATING PROCEDURES (SOP)

4.2.1 Development

As defined by the EPA, an SOP is a written document, which provides directions for the step-by-step execution of an operation, analysis, or action, which is commonly accepted as the method for performing certain routine or repetitive tasks.

The SOP format for analytical methods consists of Scope and Application; Summary; Interferences (for Method SOPs only); Equipment and Reagents; Sample Preparation; Procedures; Quality Control; Data Reduction and Calculations; Method Performance; Sample Preservation and Holding Times, Safety, Hazards and Waste Disposal; Pollution Prevention; Waste Management; Attachments and References.

4.2.2 Distribution

4.2.2.1 All SOPs for internal laboratory use are controlled and numbered documents. A red "controlled" stamp is placed onto each page of the document. Document name, SOP code, date issued and initials are recorded into a "Control SOP" logbook.

4.2.2.2 When revised SOPs are released into the laboratory, the "old" version is replaced with the "new" version. The "old" version is logged back into the "Controlled SOP" logbook. The document collected from the laboratory is then destroyed.

4.2.3 Archiving and Storage

4.2.3.1 All original, signed SOPs are stored in 3-ring binders according to categories: General Laboratory Practices, Volatile Organics, Semi-volatile Organics, Metals and General Chemistry.

4.2.3.2 Within the 3-ring binder, page dividers partition each SOP. Within each partitioned section, the current SOP version is in the front while the "older" versions are located in the back.

4.2.3.3 All hardcopies of the SOPs are stored in the QA Office indefinitely.

4.2.3.4 Electronic copies of the SOPs are located on the QA computer and on the server. The computer is virus checked at all times to deter virus data corruption. A second electronic copy is stored on a specified directory on the network. Only the QA Officer has access to this directory. The network is backed-up on a weekly basis followed by an incremental, daily back up.

4.3 PROJECT FOLDER

4.3.1 Organization

A project folder is generated for each batch of samples received at ATL-LV. Sample Control initiates the collection or preparation of the documents for the project folder. The sample control documentation includes:

4.3.1.1 Chain of Custody

4.3.1.2 Project specific information regarding:

- Detection Limits
- QA/QC analyses
- Reporting requirements
- Invoicing information
- Extended storage
- Air bill
- Faxes

4.3.1.3 The SOP for Sample Login describes the process of logging samples and developing the project folder.

4.3.2 Project File Archival

Once the final report has been mailed to the client, the project folder (which contains information such as the chain-of-custody, correspondences, raw data, reports, etc.) is archived to a file room, which has limited access. The Document Control Officer is responsible for the archiving/retrieval of the project folders. The Document Control SOP describes how documents are archived and retrieved by the Document Control Officer.

All records shall be retained for 5 years from the generation of the last entry in records. For clients that require archival of records longer than 5 years, a formal request letter must be submitted prior to the start of project.

If the company closes or changes ownership, all records will be stored and /or be transferred to the new business owner(s). Also, all clients will be notified. All project folders will be available if requested. If the client does not respond, all data associated to that ATL-LV number would be discarded after a year from the date of notification.

4.4 CONFIDENTIALITY

Original, signed reports are printed on ATL-LV's letterhead. The original report is released to the client as specified on the Chain-of-Custody. ATL-LV's client confidentiality policy assures that reports and associated documentation will only be released to the original client. ATL-LV will only release data with a written authorization from the client. For requests from a regulatory agency or from a court-of-law, the laboratory is obligated to submit all information.

4.5 COMPUTER DATA SECURITY

4.5.1 All personnel are issued a unique network user name by IT upon approval from the Technical Support Manager. Each person is required to create a unique password. The passwords should be changed at least once a year.

4.5.2 All raw data is transferred to "archive" folders located in the network server. Only the primary user and the department supervisor have access to these directories.

4.5.3 All client reports are generated from ELIMS. Client Service personnel prints the final report for faxing. The department supervisors, QA officer and upper management have access to change reviewed data. All changes are accepted by password. Amended reports are re-printed and faxed to the client.

5 ANALYTICAL METHODOLOGY

5.1 ANALYTICAL PROCEDURES

Analytical procedures used for various laboratory analyses are in accordance with the EPA approved methods. Any variances in the methods have been documented for equivalency based on accuracy and precision data. All variances in the analytical methods are noted in all corresponding SOPs. These SOPs are available to the analyst under controlled copies. New methods and/or SOPs are distributed throughout the laboratory by issuing control copies. Old methods/SOPs are collected before the new documents are given to the analysts.

Prior to acceptance and institution of new methods, satisfactory demonstration of capability is required. The demonstration of capability is done on a clean quality system matrix free of target analytes or interferences. Thereafter, continuing demonstration of method performance is required any time there is a significant change in instrumentation, personnel and methodology. The following steps shall be performed:

a. A quality control sample shall be prepared using stock standards that are prepared independently from those used in instrument calibration. The Laboratory Control Sample (LCS) is used as a quality control sample.

b. Four LCSs shall be prepared and analyzed according to the test method either concurrently or over a period of days.

c. Using all of the results, calculate the Average Recovery in the appropriate reporting units and the standard deviations.

d. Compare the Average Recovery and Standard Deviations to the corresponding criteria for accuracy and precision in the test method if there is any or to the laboratory in-house limit. The default limit is 70-130% for Average Recovery and 20% for Standard Deviations.

When one or more of the tested parameters did not meet the acceptance criteria, the analyst must perform the following:

a. Locate and correct the source of the problem and repeat by analyzing 4 LCSs again for all parameters of interest.

b. Repeat the analysis for all the parameters that failed to meet criteria by analyzing 4 LCSs. Repeated failure confirms a general problem with the measurement system and if this occurs, locate and correct the source of the problem and repeat the analysis of 4 LCSs for all compounds of interest.

A method is validated and ready for use if the calibration procedure has been completed, MDL study has been performed, procedure for demonstration of capability was conducted and proficiency testing was performed if applicable.

5.2 CALCULATION OF DATA QUALITY INDICATORS

All data generated at ATL-LV are assessed for data quality in terms of accuracy, precision, completeness, representativeness, and comparability. All of these DQO are dependent on the scope of work and the level of quality control required.

Precision, accuracy, and completeness are calculated following the equations presented below. The results are reported in QC tables with the final reported results. When the project or client requests QC data, a blank, duplicate, spike, and a standard reference material are analyzed for each set of samples for precision and accuracy data. The exact quality and quantity of the QC samples are determined by the project or client.

5.2.1 Precision

A measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions. Precision can be expressed in terms of the relative percent difference (RPD), relative standard deviation (RSD) and/or standard deviation. Analytical precision is measured by

$$RPD = \frac{(C_1 - C_2)}{[(C_1+C_2)/2]} \times 100$$

Replicate analyses of individual samples. If calculated from two replicates, use RPD.

Where:

RPD = the relative percent difference
C_1 = the larger of the two observed values
C_2 = the smaller of the two observed values

If calculated from three or more replicates, use RSD or coefficient of variation.

$$RSD = \frac{S}{\bar{Y}} \quad X\ 100\%$$

Where:

RSD = the relative standard deviation
s = the standard deviation
$\bar{Y}$ = mean of replicate measurements

Standard deviation, s, is defined as follows:

$$S = SQRT\left(\Sigma \frac{(Y_1 - \bar{Y})^2}{n - 1}\right)$$

Where:

s = standard deviation
SQRT = square root
Y_1 = measured value of replicate
$\bar{Y}$ = mean of replicate measurements
n = number of replicates

5.2.2 Accuracy:

Accuracy is measurement of the bias of a system. For measurements where matrix spikes, matrix spike duplicates and laboratory control samples are used, use percent recovery.

$$\%R = 100\ X\ \frac{S - U}{C_{sa}}$$

Where:

%R = percent recovery
S = measured concentration in spiked aliquot
U = measured concentration not spiked aliquot
C_{sa}= actual concentration of spike added

5.2.3 Method Detection Limit (MDL)

ATL-LV's methods for which the MDL are developed have been based on the EPA methods for 40 CFR 136 - Definition and Procedure for the Determination of the Method Detection Limit. ATL-LV redefines the limit of detection for each parameter annually. The calculation for MDL is defined as follows for all measurements:

$$MDL = t_{(n - 1, 1 - \alpha = 0.99)} \times S$$

Where:

MDL = the method detection limit
S = the standard deviation of the replicate analyses
$t_{(n - 1, 1 - \alpha = 0.99)}$ = the Students' t-value appropriate to a 99% confidence level and a standard deviation estimate with n-1 degrees of freedom.

6 INSTRUMENT CALIBRATION AND INTERNAL QA/QC PROCEDURES

6.1 CALIBRATION

Calibration is the process for determining the correctness of the assigned values of the physical standards used or the scales of measuring the instruments.

ATL-LV has established procedures for the calibration of each laboratory instrument and equipment. These are calibrated following the requirements of the specific methods of analysis. All calibrations and acceptance criteria are checked for conformance to these method requirements. The data resulting from the instrument calibration and the associated QC procedures used determine the frequency of the calibration process.

6.1.1 Miscellaneous equipment

6.1.1.1 Analytical and top-loading balances are calibrated using weights which are calibrated against Class "1" weights. The calibration weights bracket the weight to be measured. This calibration is recorded in the calibration notebook. The reading must be within the specified acceptance limits (See Balance SOP for details of acceptance limits). If the reading falls outside the acceptance limit, a non-conformance form must be submitted and the problem addressed. The balances are calibrated and serviced annually by an outside service technician.

6.1.1.2 Thermometers throughout the laboratory are calibrated annually against a NIST traceable thermometer. Each thermometer is labeled with an identifier code and the positive or negative correction factor. The positive or negative correction factor must be applied to all temperature readings from that particular thermometer. The reading must be within the specified limits for the type of thermometer. If the temperature reading falls outside the acceptance limit, a non-conformance form must be submitted and the problem addressed.

6.1.1.3 Pipettes are calibrated by measuring the weight of a volume of water. The calibrations of the pipettes are performed annually. The reading must be within the specified acceptance limits (See Pipette SOP for details of acceptance limits). If the reading falls outside the acceptance limit, a non-conformance form must be submitted and the problem addressed.

6.1.2. Classical Chemistry

6.1.1.1 UV/VIS Spectroscopy/Colorimetric

The Helios Gamma Spectrophotometer is initially calibrated by the manufacture. The spectrophotometer is then set to the method specified wavelength. The instrument is calibrated using a 3 to 5 point calibration utilizing standards from particular test methods. The coefficient of determination (r^2) of a linear regression calibration curve must be 0.995 or greater. A single mid-point standard is used for the continuing calibration verification (CCV). The CCV standard must correspond to ± 10% of the true value.

6.1.2.2 Titration

Calibrations for titration are based on the standardization against a primary standard. The concentration of an unknown solution can be determined by reacting a measured quantity of the unknown solution with a measured volume of an appropriate solution of known concentration.

6.1.2.3 Gravimetric

Gravimetric methods require that the sample be dried until the difference in consecutive weighings is less than 0.0005 grams. All weighings are based upon using a calibrated balance.

6.2 GENERAL QC INFORMATION

Method QA/QC is those measures taken to evaluate the method protocols and provide assurance that the values being obtained are correct. These are run at a frequency of one (1) per batch (batch QC sample frequencies and batch size are defined by the method series requirement and/or project requirements). A batch is defined as a group of samples, which are analyzed together with the same method sequence and with the manipulations common to each sample within the same time period or in continuous sequential time periods. Samples in each batch must be of similar composition.

The analysis of QC samples for organics, metals, and general chemistry demonstrate that adequate recoveries have been obtained in spiked (fortified) samples, check for matrix interference in samples, confirm that reagents used for analyses have no impurities that interfere with the analysis of the analyte, identify if cross-contamination between samples has occurred during workup, check laboratory performance against reference materials, and verify the precision and accuracy of methods. The results from

the QC samples such as matrix spike (MS), matrix spike duplicate (MSD), laboratory control sample (LCS), and surrogates (if applicable) are compiled and graphed on control charts. The primary functions of the control charts are to define control limits for the individual methods and as a performance monitoring tool.

The laboratory follows the minim um quality control requirements specified by each method (if and only if all parameters are the same). In general, these method specific quality control requirements will be used as a guideline to determine approximate limits until in-house limits can be generated. The laboratory will follow whichever limits are the most stringent.

If the method does not specify limits or guidelines for quality control requirements, the laboratory will default to recovery limits such as 80 – 120% and RPD of 20% (for inorganic methods such as wet chemistry and metals) or recovery limits of 70 – 130% and RPD of 30% (for methods such as purgeable and extractable organics) until in-house limits can be generated.

If the method only has guidelines for the quality control requirement, then the laboratory will use them strictly as guidelines and set default limits as stated above until in-house limits can be generated. In-house limits are generated using a minimum of 20 points. Average (Ave) and standard deviation (SD) were calculated and in-house limits are generated using Ave±3SD. For tests where in-house control limits are used, these are updated on a semi-annual basis.

For Field Trip and Equipment Blanks, if contaminant analyte is at or above the reporting limit and is greater than 1/10 of the amount measured in any sample, the results are considered suspect and are reported as estimated.

6.3 Instrument Calibration, Laboratory QC Procedures and Corrective Actions

Instrument calibration, QC procedures, acceptance criteria and corrective actions are described on Appendix F for organic and inorganic instrumentation analyses. In general, the following QC procedures apply:

6.3.1 Method blanks are prepared for analyses and should contain analytes less than the reporting limit. Any affected samples associated with a contaminated method blank shall be reprocessed for analysis or the results reported with appropriate data qualifying codes (B flag) if the concentration of targeted analyte in the blank is at or above the reporting limit and is greater than 1/10 of the amount measured in any sample.

6.3.2 Matrix Spike (MS) / Matrix Spike Duplicate (MSD) determines accuracy and precision by calculating the amount recovered and the relative percent difference.

6.3.2.1 Acceptance criteria for recoveries of spikes used are established in-house limits.

6.3.2.2 In general, the spike concentration is spiked at or near the midpoint calibration concentration.

6.3.2.3 Spikes and duplicates results are compared with the laboratory generated control limits for acceptance criteria.

6.3.3 A Laboratory Control Sample (LCS) is prepared and analyzed for each matrix. If the LCS falls out of limits, evaluate the system and re-analyze LCS to confirm the result. If the reanalysis passes, the sample results can be reported. If the re-analysis fails, the entire batch must be re-processed (if sample amount permits). A non-conformance form must be filled out and submitted with the sample data.

7 LIMITS OF DETECTION

The Method Detection Limits (MDL) are conducted by the laboratory on an annual basis. MDLs are performed on a more frequent basis if conditions are changed from the previous MDL study. Examples of such conditions are a new instrument, new or refurbished detector or detector components, or different purge and trap device. The MDL is defined as the minimum concentration of a substance that can be measured and reported with a 99% confidence level that the analyte concentration is greater than zero. This procedure consists of analyzing seven (7) aliquots of a standard at 3 to 5 times the estimated MDL, which is taken through all the sample processing steps of the analytical method. MDLs are matrix dependent. The MDL is defined as the student T-factor times the standard deviation from the seven replicates. See Section 5.2.4 for the equation to calculate the MDL.

Once the MDL is generated, the department supervisor, the Laboratory Director, and the QA Officer reviews and approves the MDL study as being valid. The QA Officer then collects and maintains all MDL studies.

Instrument Detection Limits (IDL), for ICP metals analysis only, is determined in the same manner as the MDL with the exception that the standards are not processed through the digestion step process.

Each MDL is compared to the current reporting limits. The analyte reporting limit must be greater than or equal to the established MDL value. The spiking concentration must not exceed 10 times the MDL value. If the MDL fails to meet these criteria, the MDL needs to be re-extracted and re-analyzed.

8 DATA COLLECTION, VALIDATION, REPORTING, AND ARCHIVING

Upon completion of all required analyses, the results are submitted for final report generation. At all stages of Data Handling (Data Collection, Validation, and Reporting), the laboratory staff and management check all data before the final deliverable package is released. The following steps detail the internal laboratory procedure that ensures the final report in a complete and concise format. The General Manager or a designated signatory person can only release the final report to the client (with their signature).

8.1 DATA COLLECTION

Computers are used to collect and quantify data from the GCMS, GC, AA, ICP and ICP-MS. For data from instruments, the data can be imported into the ELIMS for calculations and reporting. General chemistry results are manually typed into the ELIMS for reporting.

All data are spot-checked for accuracy. Concentration of the analytes found in the analysis for organics, metals, and general chemistry will be expressed according to required units depending on the sample matrix, i.e., µg/L or µg/Kg.

Data collection and review include the following:

8.1.1 Review of sample documents for completeness by the analyst(s) at each step of the analysis scheme.

8.1.2 Daily review of quality control indicators such as blanks, surrogate recoveries, duplicate analyses, matrix spikes analyses, etc. The quality control indicators must be evaluated using specific criteria described in Section 8.0. If any indicator is outside the acceptance criteria, then the analyst must follow the SOP for Non-Conformance, Corrective Actions.

8.1.3 All analyses must have data qualifiers for such items as:

- All results must be flagged if the method blank contains hits above the reporting limit.
- All results must be flagged for samples analyzed past holding time.

8.1.4 All manual integrations must be dated and initialed by the analyst.

8.1.5 The analyst prints a "preliminary" report from the ELIMS program. The analyst reviews of all raw data and the "preliminary" report prior to submittal for:

- Correct sample identification on raw data
- Correct analytical method
- Correct analyte list to report
- Matrix type and Units
- Dilution Factors
- Calculations and Significant Figures
- MDL, PQL
- Correct and complete QA/QC
- Complete technical check

The analyst submits a "First Level Data Review" sheet for each ATL-LV batch number.

8.1.6 All data must be reported in a consistent unit to allow comparability of data among organization. The standard units used to report data are listed below.

8.1.7 Units of mass/volume, volume/volume, mass/mass are reported as parts per unit. The common units are:

- Parts per Million or ppm: mg/L or uL/mL or mg/Kg
- Parts per Billion or ppb: ug/L or nL/mL or µg/Kg

8.1.8 Physical parameters are reported using common units as:

- pH (pH units)
- Hardness (mg $CaCO_3$/L)
- Alkalinity (mg $CaCO_3$/L)
- Temperature (°C or °F)
- Dissolved Oxygen (mg/L)
- Flow Rate (mL/min)

8.1.9 Data is usually reported on an "as received" basis. Solid samples results are reported in wet basis but if requested can be reported in dry basis. Other reporting units are allowed, based upon client request. Refer to appropriate project descriptions for special reporting of units.

8.2 DATA VALIDATION

Once the preliminary report has been generated, the department supervisors review the report for technical errors against the raw data submitted by the analyst(s).

Results must be checked for correlation between test results from different tests. Some tests are grouped together by type (i.e. demand, general minerals, etc.). The results from each grouping should correlate through ratios, percentages, etc. If the ratios do not meet the criteria, then check for reporting and calculation errors. If all reporting and calculations are correct, then re-analyze one or more of the tests (as necessary) and re-evaluate.

The following steps are taken during the data validation process:

- All final data are visually checked for consistency and reasonableness. Series of grossly high or grossly low results are also checked. Unusually high or unexpectedly low results are verified using a different method, where possible.
- All reported data must be within the working linear range of the instrument.
- LCS and spike recovery must be within the specified control limits, or within the laboratory generated limits, when applicable. Any out-of-control data are properly qualified with an appropriate explanation (e.g., matrix interference).
- All analytical problems encountered during sample analysis must be properly addressed to provide explanations for data reviewers.
- Checks on calculations are as follows
  - Calculations from new analyst(s) are reviewed at 100%
  - A calculation from a trained analyst(s) is subject to a minimum of a 50% review.
- Supervisors must review the raw data and report for:
  - All assigned samples are properly analyzed
  - Correct matrix and units
  - Correct and complete QA/QC
  - Correct calculations (including sample preparation factor and sample dilutions)
  - Special instruction met
- The supervisor approves the "Second Level Review Section" on the bottom of the "First Level Review" sheet. If there are any problems or questions, the supervisor sends the entire data package back to the analyst for review.

8.3 FINAL REPORT & REVIEWS

8.3.1 Final Reports

After the supervisor reviews the preliminary report, the data package is submitted to the Project Coordinator(s). The Project Coordinator(s) reviews the entire package and then fill-out a "Project Coordinator" checklist which documents typographical errors, holding time issues, project specific requirements, etc. The Project Coordinator prints the final report, which includes sample results and applicable QA/QC. The Project Coordinator approves each page of the report prior to faxing. Preliminary results can be faxed to the client with a disclaimer that the results are preliminary. In order to avoid miss-communication of results, no verbal results are given to the client.(see Appendix I)

Validated results can be e-mailed or transferred to diskette at the client's request. If there are amendments to the results, a new hardcopy report must be generated. A new electronic copy can be submitted to the client.

8.3.2 Final Review

All reports are then sent to the Laboratory Director or the designated signatory person for final review. Copies of the final report are kept in the project/batch folder, and are then archived.

If the final report is found to be incomplete or additional errors are found, it is then documented and returned to the department supervisors for correction.

QA Officer reviews at least 5% of the data generated. If the final report is found to be incomplete or errors found, it is then returned to the department supervisors for correction. An amended report is generated and sends to the Laboratory Director or the designated signatory person for final review.

8.4 AMENDMENTS

Procedures for amendments and/or additions to documentation are:

- Typographical errors (client initiated) are documented by fax from the client or by documenting the conversation on the telephone log.

- Re-analysis of a test parameter may be necessary if the data is questionable to the analyst/supervisor.
- When completed, the supervisor reviews and validates all data for precision, accuracy, completeness, and comparability.
- If any result is changed, the report is amended and is faxed and mailed to the client.
- All data is archived into the project folder.

8.5 CLIENT COMPLIANTS AND QUESTIONS

When a client has a question regarding analytical data, Project Coordinator will fill out a client complaint form and direct the questions to the department supervisors. The following steps should be followed to review data:

- Review report for typographical errors
- Review results for calculation errors
- Review raw data (calibrations, method blanks, QA/QC, dilution/concentration factors, tuning, etc.)
- Inspect original sample for visual indication of result validity.
- Inspect documentation such as the COC, verify correct sample was analyzed.
- Reanalyze sample in question by original method and by a different method to confirm results (if authorized by project coordinator)
- Inform client of findings.

All finding must be documented in the Client Complaint form.

8.6 DATA ARCHIVING

All electronic data generated by instruments are backed-up at a minimum of every 4 weeks. All data is copied from the instrument computers to specific directories on the network. Only the primary user and the department supervisor have access to these directories. The network is backed-up on a weekly basis followed by an incremental, daily tape back up. These files are then copied to a recordable CD for permanent storage.

Reports generated for the client are saved directly to a specified directory on the network. Amended reports are retrieved from and saved to the network directory. The network is backed-up on a weekly basis followed by an incremental, daily tape back up. These files are then copied to a recordable CD every 6 months.

9 CORRECTIVE ACTION

The need for corrective action comes from several sources: equipment malfunction; failure of internal QA/QC checks; failure of performance of system audits; and non-compliance with QA requirements. The Non-Conformance event is documented on a Non-Conformance/Corrective Action form. The details of how the Non-Conformance/Corrective Action form is completed and routed is in the Standard Operating Procedure (SOP).

9.1 IDENTIFYING THE PROBLEM

Listed below are the steps taken to assure corrective action is implemented

9.1.1 When measurement equipment or analytical methods fail QA/QC, the problem is immediately brought to the attention of the department supervisor, the Laboratory Director and/or QA Officer. These personnel must assess whether the problem or departure has any effect on QC policy. The analyst, supervisor, QA Officer, Sample Control personnel or Project Coordinator(s) personnel, can initiate the Non-Conformance form. The previously mentioned groups can also recommend possible corrective actions to problems. For exceptionally permitting departures from documented policies and procedures or standard specifications, all must be clearly stated in the case narrative of the report.

9.1.2 If QC measurements are found to be unacceptable, the analyst must follow corrective actions on Appendix F. Some unacceptable results may require re-analysis or re-preparation. If the re-analysis is within acceptable criteria, then the analyst does not submit a Non-Conformance form. If the re-analysis is not within acceptance criteria, then a Non-Conformance form must be submitted to document the possible matrix effects.

9.1.3 When a result in a performance audit is unacceptable, the laboratory identifies the problems and implement corrective actions immediately. Also, the unit section leader suspends the analytical work until the problem has been resolved.

9.1.4 When a system audit reveals an unacceptable performance, work is suspended until corrective action has been implemented and performance has been proven to be acceptable.

9.1.5 If failure is due to equipment malfunction, the equipment is repaired, precision and accuracy are reassessed, and the analysis is re-run. All attempts are made to reanalyze all affected parts of the analysis so that in the end, the product is not affected by failure of QA requirements.

9.1.6 All incidents of QA failure and the corrective action tasks are documented and reports are placed in the appropriate project file.

9.2 DOCUMENTING THE NON-CONFORMANCE

Once the non-conformance has been identified, a non-conformance form must be filled out and submitted to the QA Officer. The non-conformance form is a 2 page carbon-less form in which the copy is placed into the project folder and the original is submitted to the QA Officer.

The non-conformance forms contain incident description, samples affected, possible cause, corrective action, and proof of conformance.

9.3 NON-CONFORMANCE TRACKING

Once the Non-Conformance is submitted to the QA Officer, it is recorded into an Access database. This database is able to track Non-Conformances by department, analyst, test methods, matrix type, etc.

9.4 REPORTS

Non-Conformance reports for all departments are given to the Laboratory Director. Each department supervisor is also given a Non-Conformance report for his or her respective departments. The report is generated by the type of non-conformance (internal standard failed, refrigerator temperature out of limits, etc.) and by those non-conformances that are still outstanding.

The general manager/ laboratory director will decide the release of the reports having non-conformances items. Decision making for releasing the report are based on the following: (1) Technical Level –bench level operation, (2) Legal level –QA/QC conformance and regulatory, (3) Business –based on client data usage.

9.5 CLOSURE

Those non-conformances that are outstanding must be closed by the time the next report is issued to management. If these non-conformances are not closed, the QA Officer must investigate the problem and close the non-conformance.

10 HOLDING TIMES AND PRESERVATION

The laboratory conforms to all regulations for holding times and preservations. See Appendix G for tables of holding times and preservations (Referenced from EPA SW-846).

11 VERIFICATION PRACTICES

11.1 INTERLABORATORY COMPARISONS

For interlaboratory performance evaluation samples, ATL-LV utilizes the data to evaluate the analyst compared to other analysts in the area. The results of the interlaboratory comparison are recorded onto the analyst-training file. If there are "unacceptable" results, the analyst must submit a Non-Conformance Form.

11.2 PROFICIENCY TESTING PROGRAMS

ATL-LV participates in performance evaluation sample analyses as a requirement of NELAC (National Level) and ELAP (State Level). The laboratory must perform proficiency samples for wastewater, drinking water and hazardous waste. If there is "unacceptable" result, the analyst must submit a Non-Conformance form. A corrective action letter is submitted to the State Agency for all analytes that did not pass acceptance criteria. Another proficiency sample must be submitted for evaluation.

11.3 REFERENCE MATERIALS

Reference materials can be used in the laboratory to verify results against a certified value. These reference materials are purchased from NIST certified vendors. ATL-LV utilizes certified reference materials to validate methods, verify instrument performance, preparation procedures, standard preparation and calibrations.

11.4 INTERNAL QUALITY CONTROLS

The QA Officer conducts internal "blind" performance evaluation samples as part of the training program. These "blind" performance evaluation samples are submitted to the analyst after the initial training has been completed and every 12 months after proficiency has been established. All results from the internal performance evaluation samples are evaluated for accuracy. The results are graded on a "PASS/FAIL" system. All analytes that "fail" must have a corrective action and a subsequent sample will be re-submitted.

12 LABORATORY AUDITS AND APPROVALS FROM OTHER AGENCIES

12.1 AGENCY AUDITS

ATL-LV will undergo audits from the Nevada Division of Environmental Protection under the Environmental Laboratory Services division and California Environmental Laboratory Accreditation Program (CA-ELAP). As the laboratory seeks certification from other agencies, auditors from these different agencies will audit the laboratory.

12.2 CLIENT AUDITS

Clients can audit or inspect the laboratory for conformance to EPA methods and/or specific project requirements. After the audit, a formal letter describing any findings is submitted to the laboratory. All findings will require corrective actions and evidence or proof of conformance for the response letter.

12.3 INTERNAL LABORATORY AUDITS

Internal audits are performed on a semi-annual basis but may be performed more frequently if the QA Officer determines a need for more frequent audits. An internal audit encompasses Sample Control, Organics, and Inorganics. Items checked for include, but are not limited to the following:

- Runlog are checked for completeness, verification of calculations, and for standard traceability.
- Balances, oven temperatures, refrigerator temperatures are being recorded.
- Standard logbooks are checked for completeness and for traceability.

The internal audits are documented on checklists during the actual audit. A form report is generated based on the findings, and is then distributed to the General Manager, Laboratory Director, and the department supervisors.

All deficiencies found during an internal audit are written into a report. The report is then given to the General Manager, Laboratory Director, and the department supervisor. All corrections must be completed within 10 working days. A follow-up inspection is performed on the outstanding findings. Findings not completed are documented in the quarterly report to the Laboratory Director and/or General Manager.

If findings during the internal audit cast a doubt on the effectiveness of the operations or on the correctness or validity of the data, immediate investigation

and performance of corrective action is implemented by the QA Officer, department supervisor, Laboratory Director and/or the President (if necessary). Clients will be notified in writing within 24 hrs, if investigation shows that the laboratory results may have been affected.

13 QUALITY ASSURANCE REPORTS TO MANAGEMENT

Data from formal performance audits of the laboratory's activities are reviewed directly by the QA Officer, General Manager, Laboratory Director, and the department supervisors.

All quality assurance or quality control issues are discussed among the QA Officer, General Manager, Laboratory Director, and the department supervisors. The report can be used as a focal point for discussion involving corrective action. Any corrective action taken is decided with the concurrence of the unit department supervisors, the QA Officer, and/or Project Coordinator, and the Laboratory Director.

The QA Officer provides a QA/QC management report quarterly to the President. The report describes any significant quality assurance problem and/or solution, results of performance and system audits, assessment of accuracy and precision data, and health and safety issues. At the end of the calendar year, an overall QA/QC report will be compiled that will outline problems (short-term and long-term), solutions, areas to improve, and long-term goals for the upcoming year. The supervisors, Laboratory Director, and General Manager can also make comments and/or suggestions to the report.

14 REFERENCES

14.1 USEPA, Guidelines Establishing Test Procedures for Analysis of Pollutants Under the Clean Water Act; National Primary Drinking Water Regulations; and National Secondary Drinking Water Regulations; Analysis and Sampling Procedures; Final Rule, Federal Register, 40CFR Part 136, March 12, 2007.

14.2 Taylor, John K., Quality Assurance of Chemical Measurements, Lewis Publishing, 1987.

14.3 USEPA, Handbook for Analytical Quality Control in Water and Wastewater Laboratories. EPA-600/4-79-019, Environmental Monitoring and Support Laboratory, Cincinnati, OH, 1979.

14.4 USEPA, Methods for Chemical Analysis of Water and Wastes. EPA-600/4-79-020, Environmental Monitoring and Support Laboratory, Cincinnati, OH, 1979.

14.5 USEPA, Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. SW-846, Office of Soil Waste and Emergency Response, Washington, D.C., 1987.

14.6 USEPA, Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. SW-846, Office of Soil Waste and Emergency Response, Washington, D.C., 1992.

14.7 USEPA, Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. SW-846, Office of Soil Waste and Emergency Response, Washington, D.C., 1996.

14.8 USEPA, Testing Methods: Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater. EPA-600/4-82-057, Environmental Monitoring and Support Laboratory, Cincinnati, OH, 1982.

14.9 National Environmental Laboratory Accreditation Conference (NELAC) Standard 2003.

Appendices

Appendix A
ATL Organizational Chart

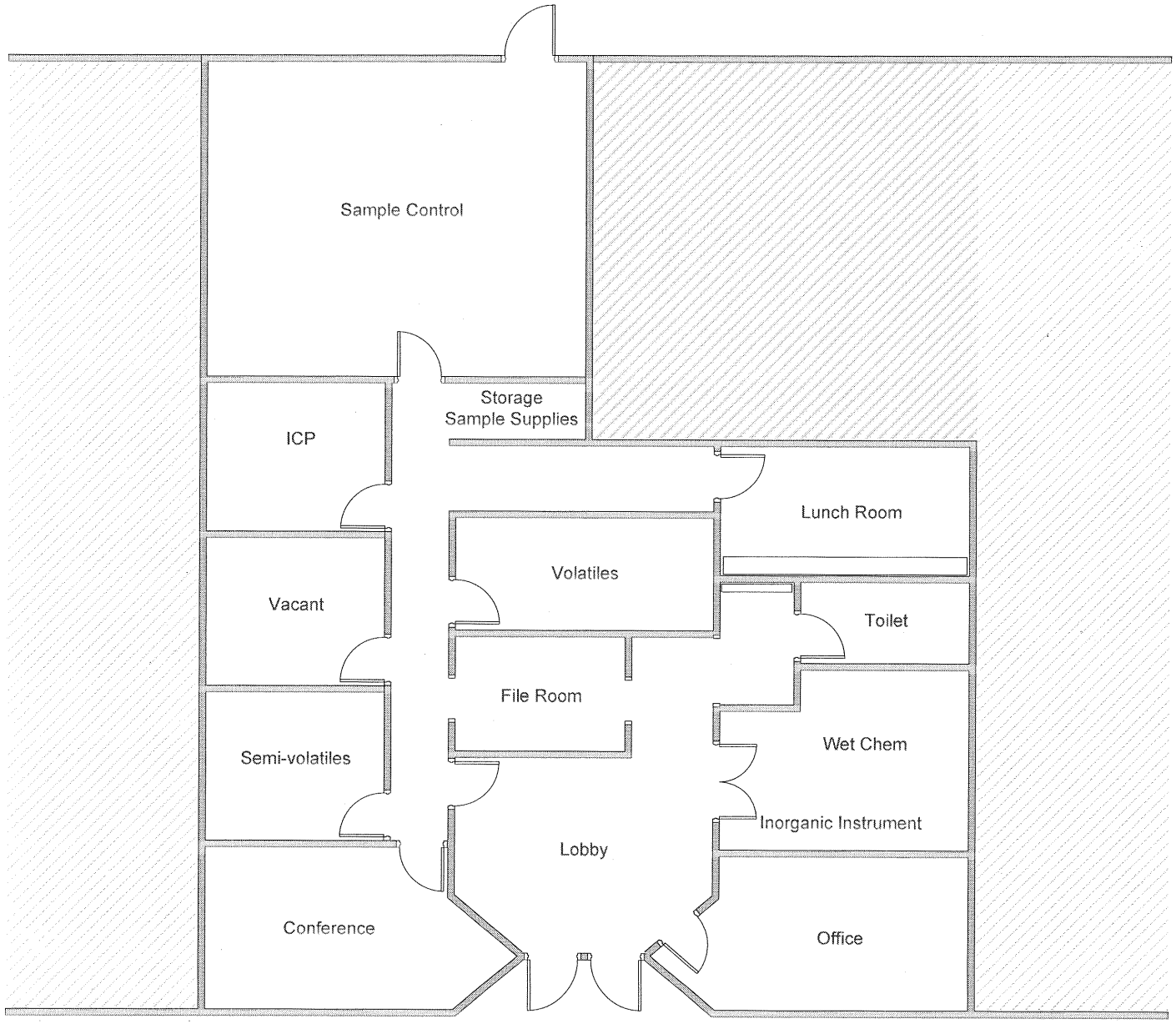
Appendix B
List of Key Personnel and Responsibilities

Advanced Technology Laboratories
Key Personnel

Name	Title	Responsibilities	Years of Experience	Education
Puri Romualdo	President	· Supervising and administrating the quality assurance program. · Ensuring that all general and client-specific quality assurance requirements are strictly followed. · Resolving the approval/rejection of deliverable client sample data package and/or reports.	**34 Years**; 2 year as President; 8 years as Vice-President of ATL ; 10 years as Vice-President of CRL; 4 years as Vice-President of ET&T; 10 years as Chemist.	B.S., Chemical Engineering
TBH	Laboratory Director	· Ensuring that sufficient numbers of qualified personnel are employed to supervise and perfom the work of the laboratory. · Enforcing the QA/QC procedures and requirements within their respective activities and areas of specialization. · Recommending process improvements and corrective actions · Maintaining an environment that emphasizes an intelligent and responsible approach to producing high data quality and accuracy based on the SOPs carried out.	.	
TBH	Organic Supervisor	· Enforcing the QA/QC procedures and requirements within their respective activities and areas of specialization. · Recommending process improvements and corrective actions. · Supervising the staff training in the procedures described in the standard operating procedures (SOPs) as they apply to the assigned responsibilities of the staff. · Maintaining an environment that emphasizes an intelligent and responsible approach to producing high data quality and accuracy based on the SOPs carried out.		
TBH	Inorganic Supervisor	· Enforcing the QA/QC procedures and requirements within their respective activities and areas of specialization. · Recommending process improvements and corrective actions. · Supervising the staff training in the procedures described in the standard operating procedures (SOPs) as they apply to the assigned responsibilities of the staff. · Maintaining an environment that emphasizes an intelligent and responsible approach to producing high data quality and accuracy based on the SOPs carried out.		
TBH	Sample Control Supervisor	· Responsible for overseeing sample log-in, proper documentation, sample tracking, sample storage, sample disposal/return, and coordination and scheduling of sampling programs.		

Name	Title	Responsibilities	Years of Experience	Education
Glen Gesmundo	QA Manager	· Responsible for implementation and monitoring of the laboratory quality assurance program · Ensuring that all data generated is scientifically sound, legally defensible, and of known precision and accuracy. · Monitoring the QA plan on a periodic basis to ensure compliance with the QA objectives of the laboratory. · Developing and implementing new QA procedures within ATL to improve data quality. · Conducting audits and inspections of all division sections on a periodic basis. · Coordinating the analysis of performance evaluation (PE) samples for all analytical divisions on a periodic basis. · Evaluating the results; reporting the results to the General Manager and appropriate Group Leaders; and applying corrective action as needed. · Establishing and maintaining statistical and data records that accurately reflect the quality assurance performance of all analytical divisions. · Maintaining and overseeing the master sources of all SOPs, training logs and completed/full laboratory notebooks. · Serving as the in-house client representative on all projects inquires involving data quality issues. · Overseeing ATL's data validation process and Electronic Data Deliverables	**6 Years;** 3 years as QA Officer 3 years Organic Chemist;	M.S., Agricultural Chemistry minor in Environmental Science BS Chemical Engineering

Appendix C
Laboratory Lay-Out



TITLE

3151-3153 W POST RD., LAS VEGAS, NV 89118

SECTION

OFFICE FLOOR PLAN

NOT TO SCALE

REVISION No.: 00	**Date:** 7 June 2007
DOCUMENT **ATL FLOORPLAN**	
AUTHORIZATION	**Page 01 of 01**

Appendix D
List of Instrumentation and Equipment

EQUIPMENT LIST

(updated 06/4/07)

Volatile Organics- EPA Method 8015B GRO and 8260B			
Qty	**Equipment**	**Make**	**Model**
2	Gas Chromatograph	Hewlett Packard	(1) 5890, 1 (6890)
1	GC Mass Spectrometer	Hewlett Packard	5973 MSD Quadrupole
2	Purge & Trap Concentrator	Tekmar	LSC 3100
2	Auto Sampler	Archon	5100
4	Data System	Hewlett Packard	Enviroquant
1	Analytical Balance	Mettler	
2	Computers	Dell	Dimension 3100
1	Printers	Hewlett Packard	
Semi-volatile Organics- EPA Method 8015B DRO			
Qty	**Equipment**	**Make**	**Model**
1	Gas Chromatograph	Hewlett Packard	5890 Series II w/2 FID
1	Liquid Auto Sampler	Hewlett Packard	7673
6	Data System	Hewlett Packard	Enviroquant
1	Computer	Dell	Dimension 3100
1	Printer	Hewlett Packard	Laser Jet 4
1	Refrigerators	GE	
Metals- EPA Method 6000/200.7			
Qty	**Equipment**	**Make**	**Model**
1	Inductively Coupled Plasma	Perkin Elmer	Optima 5300DV
1	Auto Sampler	Perkin Elmer	AS 91
1	Chiller	Polyscience	
1	Computer	Dell	Optiplex
1	Printer	Hewlett Packard	Laser Jet 1320
Classical Wet Chemistry			
Qty	**Equipment**	**Make**	**Model**
1	Analytical Balance	Sartorius	SP 180
1	Convection Oven	Scientific Products	DK-3
1	pH Meter	Orion 720a	720A
1	Turbidimeter	Le Motte	2008
1	Computer	Dell	Optiplex GX1
1	Printer	Hewlett Packard	
2	Hood	Genie Scientific	
1	Conductivity meter	Orion	115

Inorganics- EPA Method 300/218.6/7199			
Qty	**Equipment**	**Make**	**Model**
1	Ion Chromatograph	Dionex	ICS-2000
1	Ion Chromatograph	Dionex	DX-100
2	Data System	Dionex	Integrated w/instrument
2	Auto Sampler	Dionex	AS40
2	Computer	Dell	Optiplex GX1,GX270, Dimension 2400
1	Analytical Balance	Sartorius	BA100S
2	Printer	Hewlett Packard	Laser Jet 2300, 4L
Sample Preparation Chemistry			
Qty	**Equipment**	**Make**	**Model**
1	Hot Block Digester	Env.Express	-----
1	Computer	Dell	Optiplex GX100,
1	Fume Hood	Genie Scientific	
1	Sonicator	Tekmar	Various
1	Top Loading Balance	Mettler	DB202
Sample Control			
Qty	**Equipment**	**Make**	**Model**
1	Top Loading Balance	Sartorius	B3103
20	Sample Coolers	Miscellaneous	Various sizes
1	Refrigerator	VWR	4°C coolers
1	Computer	Dell	Dimension 3100
1	Printer/Copier/Fax	Brother	7820 N
2	Barcode Printer	Zebra	Z4000
2	Barcode Scanner	Metrologic	MS 6720
1	Fume Hood	Genie Scientific	Custom
Document Control/Client Services			
Qty	**Equipment**	**Make**	**Model**
1	Computer	Dell	GX240
1	Copier/Scanner /Printer	Konica Minolta	Di5520
Laboratory Information Management System (LIMS)			
1	SQL-SVR	Dell	Power Edge (LIMS Data)
1	Computer	Dell	Dimension 3100
Health and Safety			
Qty	**Equipment**	**Make**	**Model**
3	First Aid Kits	Lab Safety Products	Various
4	Fire Extinguishers	Underwriter Laboratories	First Alert
2	Portable Eye Wash/Plumbed	Various	
1	Spill Containment Set-up	Labconco	-----

1	Spill Kit	Labconco	-----
Field/Courier Services			
1	Field Truck	Ford	Escape
1	pH meter	VWR	2000/3000 series
1	Utility Vehicle	Chevy	Colorado

Appendix E
ATL Chain-of-Custody Form

Advanced Technology Laboratories
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel: (702) 307-2659 • Fax: (702) 307-2691

FOR LABORATORY USE ONLY

P.O. #: _____
Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt
1. CHILLED Y ☐ N ☐ 4. SEALED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐ 5. # OF SPLS MATCH COC Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐ 6. PRESERVED Y ☐ N ☐

Client: | Address: | Tel:
Attention: | City: State: Zip Code: | Fax:
Project Name: | Project #: | Sampler: (Printed Name) (Signature)

Glen Gesmundo | Date: | Time: | Received by: (Signature and Printed Name) | Date: | Time:
Relinquished by: (Signature and Printed Name) | Date: | Time: | Received by: (Signature and Printed Name) | Date: | Time:
Relinquished by: (Signature and Printed Name) | Date: | Time: | Received by: (Signature and Printed Name) | Date: | Time:

I hereby authorize ATL to perform the work indicated below:
Print Name Date
Signature

Send Report To:
Attn: _____
Co: _____
Addr: _____
City: State: Zip:

Bill To:
Attn: _____
Co: _____
Addr: _____
City: State: Zip:

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample :$2.00 / sample /mo (after 45 days)
- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested: 8081A (Pesticides), 8082 (PCB), 8260B (Volatiles), 8270C (BNA), 6010B (Total Metal), 8015B (GRO), 8015B (DRO), 8021 (BTEX), TITLE 22 / CAM 17 (6010 / 7000)

SPECIFY APPROPRIATE MATRIX: SOIL, WATER, GROUND WATER, WASTEWATER

PRESERVATION

QA/QC
RTNE ☐
CT ☐
SWRCB ☐ Logcode_____
OTHER _____

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample ID / Location	Date	Time	TAT	Container(s): #	Container(s): Type	REMARKS

- TAT starts 8AM the following day if samples received after 3 PM

TAT: ☐ A = Overnight ≤ 24 hrs ☐ B = mergency ext Workday ☐ C = Critical 2 Workdays ☐ D = nt orkdays ☐ E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives:
H=HCl N=HNO_3 S=H_2SO_4 C=4°C
Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

Appendix F:
Tables of Instrument Calibration, Laboratory QC Procedures
and Corrective Actions

Appendix F. Summary of Instrument Calibration, Laboratory QC Procedures and Corrective Actions.

Method EPA 8260B/EPA 624 (Volatile Organics by GC-MS)			
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**
Check of mass spectral ion intensities using BFB	Prior to initial calibration and calibration verification	As listed in SW8260B	Evaluate system. Retune Instrument.
Five point calibration	Initial calibration prior to sample analysis	Bromoform, chloromethane, 1,1-dichloroethane ave. RF>0.1. All other SPCCs ave. RF≥0.30. For CCCs, %RSD ≤30.	Evaluate System. Repeat initial calibration.
		For Target Analytes: 1. **Ave of RF:** mean %RSD for all analytes ≤ 15% 2. **Linear Regression:** r^2=0.99	If mean %RSD exceeds 15%, choose linear regression.
Second Source calibration verification	With each initial calibration	Bromoform, chloromethane, 1,1-dichloroethane ave. RF>0.1. All other SPCCs ave. RF≥0.30. For CCCs, %RSD ≤20%.	Correct problem, then repeat initial calibration
Continuing Calibration Verification (CCV)	Beginning of each analytical sequence and every 12 hours for Method 8260B and 24 hours for Method 624.	Bromoform, chloromethane, 1,1-dichloroethane ave. RF>0.1. All other SPCCs ave. RF≥0.30. For CCCs, %RSD ≤20%.	a. Evaluate system. Correct problem. Rerun standard. b. Reprep standards and recalibrate. Rerun affected samples.
Internal Standards	Each calibration standard and sample	IS area for sample must be within –50% to + 200% of last calibration verification standard. IS RT for sample must be ± 30 seconds of the IS RT in calibration verification standard.	a.Check calculations, standard preparation, instrument malfunction and sample interferences. Rerun the sample. b. Recalibrate the instrument.
Method Blank	One per batch of 20 samples	All analytes < PQL.	Investigate source of contamination. Clean instrument if necessary and rerun blank.
Laboratory Control Sample (LCS)	Minimum of one LCS per batch of 20 samples.	In house established limits.	a.Check calculations. Check standards preparation. Check for instrument malfunction. Rerun the LCS. b. If out the second time, recalibrate and reanalyze the entire batch.

Method EPA 8260B/EPA 624 (Volatile Organics by GC-MS) continued			
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**
Retention time(RT) evaluation	Each sample	Relative retention time (RRT) within ± 0.06 units of RRT in continuing calibration standard.	Correct problem. Check for interferences. Reanalyze all affected samples.
Matrix spike/matrix spike duplicate (MS/MSD)	One MS/MSD per batch of 20 samples. Same spiking analytes as LCS.	In-house established limits.	Check for standards preparation. Check for interferences. Review against LCS recoveries to look for trends. If poor recovery is indicative of laboratory problems, re-prepare and re-analyze batch. Otherwise, if LCS passed QC criteria batch is validated by the LCS.
Surrogate Spike	Added to every sample including standards and blanks prior to analysis.	In-house established limits.	a.Check for instrument malfunction. Check for sample interference. Rerun the sample. b. Recalibrate the instrument.
MDL study	One per instrument per year.	For all analytes MDL should be < PQL.	Check instrument. Re-do MDL.

Method EPA 8270C/625 (Semivolatile Organics by GC-MS			
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**
Check of mass spectral ion intensities using DFTPP.	Prior to initial calibration and calibration verification	As listed in SW8270C	Evaluate system. Retune Instrument.
Five point calibration	Initial calibration prior to sample analysis	All SPCCs ave. RF≥0.050. and CCCs %RSD ≤30%.	Evaluate System. Repeat initial calibration.
		For Target Analytes: 1. **Ave of RF**: mean %RSD for all analytes ≤ 15%. For Method 625, all target analytes %RSD ≤ 35. 2. **Linear Regression:** r^2=0.99	If mean %RSD exceeds 15% for Method 8270C and 35% for Method 625,choose linear regression.
Second Source calibration verification	With each initial calibration	All SPCCs ave. RF≥0.050. and CCCs %RSD ≤20%	Correct problem, then repeat initial calibration
Continuing Calibration Verification (CCV)	Beginning of each analytical sequence and every 12 hours for Method 8270C and 24 hours for Method 625.	All SPCCs ave. RF≥0.050. and CCCs %RSD ≤30. For Method 625, all analytes must be ≤20%.	a. Evaluate system. Correct problem. Rerun standard. b. Reprep standards and recalibrate. Rerun affected samples.
Internal Standards	Each calibration standard and sample	IS area for sample must be within –50% to + 200% of last calibration verification standard. IS RT for sample must be ± 30 seconds of the IS RT in calibration verification standard.	a.Check calculations, standard preparation, instrument malfunction and sample interferences. Rerun the sample. b. Recalibrate the instrument.
Method Blank	One per batch of 20 samples	All analytes < PQL.	Investigate source of contamination. Clean instrument if necessary and rerun blank.
Laboratory Control Sample (LCS)	Minimum of one LCS per batch of 20 samples.	In house established limits.	a.Check calculations. Check standards preparation. Check for instrument malfunction. Rerun the LCS. b. If out the second time, reprepare the entire batch.

Method EPA 8270C/625 (Semivolatile Organics by GC-MS continued			
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**
Retention time(RT) evaluation	Each sample	Relative retention time (RRT) within ± 0.06 units of RRT in continuing calibration standard.	Correct problem. Check for interferences. Reanalyze all affected samples.
Matrix spike/matrix spike duplicate (MS/MSD)	One MS/MSD per batch of 20 samples. Same spiking analytes as LCS.	In-house established limits.	Check for standards preparation. Check for interferences. Review against LCS recoveries to look for trends. If poor recovery is indicative of laboratory problems, re-prepare and re-analyze batch. Otherwise, if LCS passed QC criteria batch is validated by the LCS.
Surrogate Spike	Added to every sample including standards and blanks prior to analysis.	In-house established limits.	Check for instrument malfunction. Check for sample interference. Re-extract and rerun the sample.
MDL study	One per instrument per year.	For all analytes MDL should be < PQL.	Check instrument. Re-do MDL.

Methods EPA 8015B (Total Volatile Petroleum Hydrocarbons by GC/FID [Gas])			
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**
Five point calibration	Initial calibration prior to sample analysis	Ave RF: % RSD ≤ 20	Evaluate system. Repeat calibration.
Second Source calibration verification	With each initial calibration	RF for analyte within 15% of average RF.	Correct problem, then repeat initial calibration
Continuing Calibration Verification (CCV)	Beginning of each analytical sequence and after every 12 hours.	RF for analyte within 15% of average RF.	a. Evaluate system. Correct problem. Rerun standard. b. Reprep standards and recalibrate. Rerun affected samples.
Method Blank	One per batch of 20 samples	All analytes < PQL.	Investigate source of contamination. Clean instrument if necessary and rerun blank.
Laboratory Control Sample (LCS)	Minimum of one LCS per batch of 20 samples.	In house established limits.	a.Check calculations. Check standards preparation. Check for instrument malfunction. Rerun the LCS. b. If out the second time, re-prepare the entire batch.
Matrix spike/matrix spike duplicate (MS/MSD)	One MS/MSD per batch of 20 samples. Same spiking analytes as LCS.	In-house established limits.	Check for standards preparation. Check for interferences. Review against LCS recoveries to look for trends. If poor recovery is indicative of laboratory problems, re-prepare and re-analyze batch. Otherwise, if LCS passed QC criteriabatch is validated by the LCS.
Surrogate Spike	Added to every sample including standards and blanks prior to analysis.	In-house established limits.	a.Check for instrument malfunction. Check for sample interference. Re-extract and rerun the sample. b. Recalibrate the instrument.
MDL study	One per instrument per year.	For all analytes MDL should be < PQL.	Check instrument. Re-do MDL.

EPA 8015B (Total Extractable Petroleum Hydrocarbons by GC/FID[Diesel])			
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**
Five point calibration	Initial calibration prior to sample analysis	Ave RF: % RSD ≤ 20	Evaluate system. Repeat calibration.
Second Source calibration verification	With each initial calibration	RF for analyte within 15% of average RF.	Correct problem, then repeat initial calibration
Continuing Calibration Verification (CCV)	Beginning of each analytical sequence and after every 12 hours.	RF for analyte within 15% of average RF.	a. Evaluate system. Correct problem. Rerun standard. b. Reprep standards and recalibrate. Rerun affected samples.
Method Blank	One per batch of 20 samples	All analytes < PQL.	Investigate source of contamination. Clean instrument if necessary and rerun blank.
Laboratory Control Sample (LCS)	Minimum of one LCS per batch of 20 samples.	In house established limits.	a.Check calculations. Check standards preparation. Check for instrument malfunction. Rerun the LCS. b. If out the second time, re-prepare the entire batch.
Matrix spike/matrix spike duplicate (MS/MSD)	One MS/MSD per batch of 20 samples. Same spiking analytes as LCS.	In-house established limits.	Check for standards preparation. Check for interferences. Review against LCS recoveries to look for trends. If poor recovery is indicative of laboratory problems, re-prepare and re-analyze batch. Otherwise, if LCS passed QC criteriabatch is validated by the LCS.
Surrogate Spike	Added to every sample including standards and blanks prior to analysis.	In-house established limits.	a.Check for instrument malfunction. Check for sample interference. Re-extract and rerun the sample. b. Recalibrate the instrument.
MDL study	One per instrument per year.	For all analytes MDL should be < PQL.	Check instrument. Re-do MDL.

EPA 8021B ([BTEX + MTBE] Aromatic Halogenated Volatiles			
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**
Five point calibration	Initial calibration prior to sample analysis	Ave RF: % RSD ≤ 20	Evaluate system. Repeat calibration.
Second Source calibration verification	With each initial calibration	RF for analyte within 15% of average RF.	Correct problem, then repeat initial calibration
Continuing Calibration Verification (CCV)	Beginning of each analytical sequence and after every 12 hours.	RF for analyte within 15% of average RF.	a. Evaluate system. Correct problem. Rerun standard. b. Reprep standards and recalibrate. Rerun affected samples.
Method Blank	One per batch of 20 samples	All analytes < PQL.	Investigate source of contamination. Clean instrument if necessary and rerun blank.
Laboratory Control Sample (LCS)	Minimum of one LCS per batch of 20 samples.	In house established limits.	a.Check calculations. Check standards preparation. Check for instrument malfunction. Rerun the LCS. b. If out the second time, reprepare the entire batch.
Matrix spike/matrix spike duplicate (MS/MSD)	One MS/MSD per batch of 20 samples. Same spiking analytes as LCS.	In-house established limits.	Check for standards preparation. Check for interferences. Review against LCS recoveries to look for trends. If poor recovery is indicative of laboratory problems, re-prepare and re-analyze batch. Otherwise, if LCS passed QC criteriabatch is validated by the LCS.
Surrogate Spike	Added to every sample including standards and blanks prior to analysis.	In-house established limits.	a.Check for instrument malfunction. Check for sample interference. Re-extract and rerun the sample. b. Recalibrate the instrument.
MDL study	One per instrument per year.	For all analytes MDL should be < PQL.	Check instrument. Re-do MDL.

EPA 8081A (Organochlorine Pesticides)			
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**
Pesticide Evaluation Mix (Breakdown check using DDT and Endrin)	Prior to initial calibration and continuing calibration verification	Calculated % breakdown must be ≤ 15% for both Endrin and DDT.	Evaluate system. Perform maintenance. Re-analyze PEM.
Five point calibration	Initial calibration prior to sample analysis	1. **Ave RF:** % RSD ≤ 20 2. **Linear regression:** $r^2 > 0.99$ 3. **RSD Averaging:** Ave % RSD for all analytes including surrogates must be ≤ 20%.	Evaluate system. Repeat calibration.
Second Source calibration verification	With each initial calibration	RF for analytes within 15% of average RF or average of all % RSD for all analytes and surrogates is ≤ 15%.	Correct problem, then repeat initial calibration
Continuing Calibration Verification (CCV)	Beginning of each analytical sequence and after every 12 hours.	RF for analytes within 15% of average RF or average of all % RSD for all analytes and surrogates is ≤ 15%.	a. Evaluate system. Correct problem. Rerun standard. b. Reprep standards and recalibrate. Rerun affected samples.
Method Blank	One per batch of 20 samples	All analytes < PQL.	Investigate source of contamination. Clean instrument if necessary and rerun blank.
Laboratory Control Sample (LCS)	Minimum of one LCS per batch of 20 samples.	In house established limits.	a.Check calculations. Check standards preparation. Check for instrument malfunction. Rerun the LCS. b. If out the second time, rep-repare the entire batch.
Matrix spike/matrix spike duplicate (MS/MSD)	One MS/MSD per batch of 20 samples. Same spiking analytes as LCS.	In-house established limits.	Check for standards preparation. Check for interferences. Review against LCS recoveries to look for trends. If poor recovery is indicative of laboratory problems, re-prepare and re-analyze batch. Otherwise, if LCS passed QC criteria batch is validated by the LCS.
Surrogate Spike	Added to every sample including standards and blanks prior to analysis.	In-house established limits.	a.Check for instrument malfunction. Check for sample interference. Re-extract and rerun the sample. b. Recalibrate the instrument.
MDL study	One per instrument per year.	For all analytes MDL should be < PQL.	Check instrument. Re-do MDL.

EPA 8082 (Polychlorinated Biphenyls [PCBs])			
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**
Five point calibration	Initial calibration prior to sample analysis	1. **Ave RF:** % RSD ≤ 20 2. **Linear regression:** $r^2 > 0.99$ 3. **RSD Averaging:** Ave % RSD for all analytes including surrogates must be ≤ 20%.	Evaluate system. Repeat calibration.
Second Source calibration verification	With each initial calibration	RF for analytes within 15% of average RF or average of all % RSD for all analytes and surrogates is ≤ 15%.	Correct problem, then repeat initial calibration
Continuing Calibration Verification (CCV)	Beginning of each analytical sequence and after every 12 hours.	RF for analytes within 15% of average RF or average of all % RSD for all analytes and surrogates is ≤ 15%.	a. Evaluate system. Correct problem. Rerun standard. b. Reprep standards and recalibrate. Rerun affected samples.
Method Blank	One per batch of 20 samples	All analytes < PQL.	Investigate source of contamination. Clean instrument if necessary and rerun blank.
Laboratory Control Sample (LCS)	Minimum of one LCS per batch of 20 samples.	In house established limits.	a.Check calculations. Check standards preparation. Check for instrument malfunction. Rerun the LCS. b. If out the second time, reprepare the entire batch.
Matrix spike/matrix spike duplicate (MS/MSD)	One MS/MSD per batch of 20 samples. Same spiking analytes as LCS.	In-house established limits.	Check for standards preparation. Check for interferences. Review against LCS recoveries to look for trends. If poor recovery is indicative of laboratory problems, re-prepare and re-analyze batch. Otherwise, if LCS passed QC critera batch is validated by the LCS.
Surrogate Spike	Added to every sample including standards and blanks prior to analysis.	In-house established limits.	a.Check for instrument malfunction. Check for sample interference. Re-extract and rerun the sample. b. Recalibrate the instrument.
MDL study	One per instrument per year.	For all analytes MDL should be < PQL.	Check instrument. Re-do MDL.

Method EPA 6010B (Metals by ICP) and 200.8(Metals by ICPMS).			
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**
Initial Calibration	Initial calibration prior to sample analysis	r>0.995	Evaluate system. Repeat calibration.
Initial calibration verification (second source) ICV	With each initial calibration	Within 10% of expected value.	Correct problem, then repeat initial calibration
Initial Calibration Blank (ICB)/ Continuing Calibration Blank (CCB)	After initial calibration, every 10 samples, and at the end of analytical sequence.	All analytes < PQL.	Investigate source of contamination. Clean instrument if necessary and rerun blank
Interference Check Standard AB (ICSAB) (For ICP only)	At the beginning of analytical sequence.	Within 20% of expected value.	a.Investigate source of interference. Correct instrument if necessary and rerun ICSAB. b. Adjust interelement correction factors. Recalibrate the instrument.
Continuing calibration verification (CCV)	After every ten samples and at the end of the analytical sequence.	Recoveries within ± 10% of expected value.	a. Evaluate system. Rerun standard. b. Reprep standard and recalibrate. Rerun affected samples.
Method Blank	One per batch of 20 samples	All analytes < PQL.	Investigate source of contamination. Clean instrument if necessary and rerun blank.
Laboratory Control Sample (LCS)	Minimum of one LCS per batch of 20 samples.	In house established limits.	a.Check calculations. Check standards preparation. Check for instrument malfunction. Rerun the LCS. b. If out the second time, reprepare the entire batch.
Matrix spike/matrix spike duplicate (MS/MSD)	One MS/MSD per batch of 20 samples. Same spiking analytes as LCS.	In-house established limits.	Check for standards preparation. Check for interferences. Review against LCS recoveries to look for trends. If poor recovery is indicative of laboratory problems, re-prepare and re-analyze batch. Otherwise, if LCS passed QC criteria batch is validated by the LCS.
Internal Standard (200.8 only)	Added to every sample including standards and blanks prior to analysis.	60-125% of ICB's IS intensity	a.Check for instrument malfunction. Check for sample interference. Rerun the sample. b. Recalibrate the instrument.
MDL study	One per instrument per year.	For all analytes MDL should be <PQL.	Check instrument. Re-do MDL.

EPA 7000 series(Metals by AA)			
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**
Initial Calibration (minimum of 3 standards and a calibration blank)	Initial calibration prior to sample analysis	r > 0.995	Evaluate system. Repeat calibration.
Initial calibration verification (second source) ICV	With each initial calibration	Within 10% of expected value.	Correct problem, then repeat initial calibration
Initial Calibration Blank (ICB)/ Continuing Calibration Blank (CCB)	After initial calibration, every 10 samples, and at the end of analytical sequence.	All analytes < PQL.	Investigate source of contamination. Clean instrument if necessary and rerun blank
Continuing calibration verification (CCV)	After every ten samples and at the end of the analytical sequence.	Recoveries within ± 10% of expected value.	a. Evaluate system. Rerun standard. b. Reprep standard and recalibrate. Rerun affected samples.
Method Blank	One per batch of 20 samples	All analytes < PQL.	Investigate source of contamination. Clean instrument if necessary and rerun blank.
Laboratory Control Sample (LCS)	Minimum of one LCS per batch of 20 samples.	In house established limits.	a.Check calculations. Check standards preparation. Check for instrument malfunction. Rerun the LCS. b. If out the second time, reprepare the entire batch.
Matrix spike/matrix spike duplicate (MS/MSD)	One MS/MSD per batch of 20 samples. Same spiking analytes as LCS.	In-house established limits.	Check for standards preparation. Check for interferences. Review against LCS recoveries to look for trends. If poor recovery is indicative of laboratory problems, re-prepare and re-analyze batch. Otherwise, if LCS passed QC criteria batch is validated by the LCS.
MDL study	One per instrument per year.	For all analytes MDL should be < PQL.	Check instrument. Re-do MDL.

EPA 300.0 (Inorganic Anions by IC)			
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**
Initial Calibration (minimum of 3 standards and a calibration blank)	Initial calibration prior to sample analysis	r > 0.995	Evaluate system. Repeat calibration.
Initial calibration verification (second source) ICV	With each initial calibration	Within 10% of expected value.	Correct problem, then repeat initial calibration
Initial Calibration Blank (ICB)	After initial calibration, every 10 samples, and at the end of analytical sequence.	All analytes < RL.	Investigate source of contamination. Clean instrument if necessary and rerun blank
Continuing calibration verification (CCV)	After every ten samples and at the end of the analytical sequence.	Recoveries within ± 10% of expected value.	a. Evaluate system. Rerun standard. b. Reprep standard and recalibrate. Rerun affected samples.
Method Blank	One per batch of 20 samples	All analytes < RL.	Investigate source of contamination. Clean instrument if necessary and rerun blank.
Laboratory Control Sample (LCS)	Minimum of one LCS per batch of 20 samples.	80-120%	a.Check calculations. Check standards preparation. Check for instrument malfunction. Rerun the LCS. b. If out the second time, reprepare the entire batch.
Matrix spike/matrix spike duplicate (MS/MSD)	One MS/MSD per batch of 20 samples. Same spiking analytes as LCS.	80-120%	Check for standards preparation. Check for interferences. Review against LCS recoveries to look for trends. If poor recovery is indicative of laboratory problems, re-prepare and re-analyze batch. Otherwise, if LCS passed QC criteria batch is validated by the LCS.
MDL study	Twice a year per instrument .	For all analytes MDL should be < PQL.	Check instrument. Re-do MDL.

Spectrophotometer Tests			
Calibration QC Check	**Frequency**	**Acceptance Criteria**	**Corrective Action**
Initial Calibration	Initial calibration prior to sample analysis	r > 0.995	Evaluate system. Repeat calibration.
Initial calibration verification (second source) ICV	With each initial calibration	Within 10% of expected value.	Correct problem, then repeat initial calibration
Continuing Calibration	Every 20 samples	± 10%	a. Evaluate system. Rerun standard. b. Reprep standard and recalibrate. Rerun affected samples.
Method Blank	Every 20 samples	< PQL	Investigate source of contamination. Clean instrument if necessary and rerun blank.
Laboratory Control Sample (LCS)	Every 20 samples	80 – 120%	a.Check calculations. Check standards preparation. Check for instrument malfunction. Rerun the LCS. b. If out the second time, reprepare the entire batch.
Matrix spike/matrix spike duplicate (MS/MSD)	Every 20 samples	80-120%	Check for standards preparation. Check for interferences. Review against LCS recoveries to look for trends. If poor recovery is indicative of laboratory problems, re-prepare and re-analyze batch. Otherwise, if LCS passed QC criteria batch is validated by the LCS.
MDL study	One for each test per year.	For all analytes MDL should be < PQL.	Check instrument. Re-do MDL.
Titration Tests			
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**
Titrant standardization	Every 20 samples	Within 5% of expected concentration	Check calculations and standard preparation. Reanalyze.
Method Blank	Every 20 samples	< PQL	Investigate source of contamination. Reanalyze.
Laboratory Control Sample (LCS)	Every 20 samples	80 – 120%	a.Check calculations. Check standards preparation. Rerun the LCS. b. All samples (including QC samples) must be reanalyze if LCS fails.
Matrix spike/matrix spike duplicate (MS/MSD)	Every 20 samples	80-120%	Check for standards preparation. Check for interferences. Review against LCS recoveries to look for trends. If poor recovery is indicative of laboratory problems, re-prepare and re-analyze batch. Otherwise, if LCS passed QC criteria batch is validated by the LCS.

pH			
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**
Three Buffers	Beginning of use / new chemist	Within 0.1 unit of true value	Recalibrate instrument.
Buffer Check	Every 10 samples and at the end of the sample batch.	Within 0.1 unit of true value	Recalibrate instrument.
Duplicate	Every 10 samples	% RPD must be < current control limits	Reanalyze original sample and sample duplicate.
Gravimetric Tests			
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**
Balance Check	Beginning of use.	Within current control limits.	Recalibrate instrument.
Method Blank	Every 20 samples	< PQL	Investigate source of contamination. Reanalyze.
Laboratory Control Sample (LCS)	Every 20 samples	80 – 120%	a.Check calculations. Check standards preparation. Rerun the LCS. b. All samples (including QC samples) must be reanalyze if LCS fails.
Matrix spike/matrix spike duplicate (MS/MSD)	Every 20 samples	80-120%	Check for standards preparation. Check for interferences. Review against LCS recoveries to look for trends. If poor recovery is indicative of laboratory problems, re-prepare and re-analyze batch. Otherwise, if LCS passed QC criteria batch is validated by the LCS.
Sample Duplicate	Every 20 samples	RPD: 20%	Reanalyze original sample and sample duplicate.

Distillation Tests +Spectrophotometer Tests			
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**
Initial Calibration	Initial calibration prior to sample analysis	r > 0.995	Evaluate system. Repeat calibration.
Continuing Calibration	Every 20 samples	± 10%	a. Evaluate system. Rerun standard. b. Reprep standard and recalibrate. Rerun affected samples.
Method Blank	Every 20 samples	< PQL	Investigate source of contamination. Reanalyze.
Laboratory Control Sample (LCS)	Every 20 samples	80 – 120%	a.Check calculations. Check standards preparation. Rerun the LCS. b. All samples (including QC samples) must be reanalyze if LCS fails.
Matrix Spike / Matrix Spike Duplicate (MS/MSD)	Every 20 samples	80 – 120% (70-120%: sulfide)	Check for standards preparation. Check for interferences. Review against LCS recoveries to look for trends. If poor recovery is indicative of laboratory problems, re-prepare and re-analyze batch. Otherwise, if LCS passed QC criteria batch is validated by the LCS
MDL study	One for each test per year.	For all analytes MDL should be < PQL.	Check instrument. Re-do MDL.

Appendix G
Tables of Holding Times & Preservation

Holding Times and Containers for Water/Aqueous Samples					
Volatile Organics	**Method**	**Holding Time (days)**	**Minimum Volume (mL)**	**Container**	**Preservation**
GRO	EPA 8015B	14**	40	3 x 40 ml VOA vials	HCl, 4°C
Purgeable Halocarbons/Aromatics	EPA 8260(8021B list)	14**	40	3 x 40 ml VOA vials	HCl, 4°C
VOCs	EPA 8260B/624	14**	40	3 x 40 ml VOA vials	HCl, 4°C
TPH(g)/BTEX/MTBE	EPA 8015B(M)/8021B	14**	40	3 x 40 ml VOA vials	HCl, 4°C
** 7 days without HCl					
Semivolatile Organics	**Method**	**Holding Time (days)**	**Minimum Volume (mL)**	**Container**	**Preservation**
DRO	EPA 8015B	7*	1000	1 L amber glass	4°C,**
PCBs	EPA 8082/608	7*	1000	1 L amber glass	4°C,**
Pesticides, Organochlorine	EPA 8081A/608	7*	1000	1 L amber glass	4°C,**
Phenols	EPA 8270C	7*	1000	1 L amber glass	4°C,**
SVOCs (BNAs)	EPA 8270C/625	7*	1000	1 L amber glass	4°C,**
TPH(d)	EPA 8015B(M)	7*	1000	1 L amber glass	4°C,**
TPH-CC (C8-C40)	EPA 8015B(M)	7*	1000	1 L amber glass	4°C,**
* 7 days for extraction; 40 days after extraction for analysis. **If sampling from location where residual chlorine is present, samples have to be treated with sodium thiosulfate (Na2S2O3)					
General Chemistry	**Method**	**Holding Time (days)**	**Minimum Volume (mL)**	**Container**	**Preservation**
Acidity	EPA 305.1	14	100	125 ml HDPE	4°C
Alkalinity	EPA 310.1	14	100	125 ml HDPE	4°C
Biochemical Oxygen Demand(BOD/cBOD)	EPA 405.1/SM 5210B	48 hours	300	500 ml HDPE	4°C
Bromide	EPA 300.0	28	50	125 ml HDPE	4°C
Chemical Oxygen Demand (COD)	EPA 410.4/SM 5220D	28	50	125 ml HDPE	H2SO4 / 4°C
Chloride	EPA 300.0 / 325.3	28	50	125 ml HDPE	4°C
Chlorine, Free	SM 4500-Cl-G	15 minutes	100	125 ml HDPE	4°C
Chlorine, Total Residual	SM 4500-Cl-G / EPA 330.3	15 minutes	100	125 ml HDPE	4°C
Chromium VI (Hexavalent Chromium)	EPA 7196A, EPA 7199, EPA 218.6	24 hours	100	125 ml HDPE	4°C
Cyanide, Amenable	EPA 335.1	14	250	250 ml HDPE	NaOH / 4°C
Cyanide, Total	EPA 335.2/EPA 9014	14	250	250 ml HDPE	NaOH / 4°C

Fluoride	EPA 300.0 / 340.2	28	100	125 ml HDPE	4°C
Hardness, Total	EPA 130.2/SM 2340B	180	100	250 ml HDPE	HNO_3
Oil and Grease	EPA 1664 HEM	28	1000	1 L amber glass	HCl
Ignitability (Flashpoint)	EPA 1010	14	250	250 ml HDPE	4°C
Mercaptans	LACSD 258	48 hours	50	125 ml HDPE	4°C
Nitrogen,Ammonia (NH_3)	EPA 350.2	28	250	250 ml HDPE	H2SO4 / 4°C
Nitrogen, Nitrate (NO_3)	EPA 300.0 / 353.3	48 hours	50	125 ml HDPE	4°C
Nitrogen, Nitrite (NO_2)	EPA 300.0/354.1	48 hours	50	125 ml HDPE	4°C
pH	EPA 150.1	15 minutes	50	125 ml HDPE	4°C
Phenolics, Total	EPA 420.1	28	300	500 ml amber glass	H2SO4 / 4°C
Phosphate, Ortho	EPA 300.0/365.3/365.2	48 hours	50	125 ml HDPE	4°C
Phosphorus, Dissolved	EPA 365.3/365.2	28	100	125 ml HDPE	4°C
Phosphorus, Total	EPA 365.3/365.2	28	100	125 ml glass	H2SO4 / 4°C
Solids, Total Dissolved (TDS)	EPA 160.1	7	500	500 ml HDPE	4°C
Solids, Total Suspended (TSS)	EPA 160.2	7	500	500 ml HDPE	4°C
Solids, Total (TS)	EPA 160.3	7	200	500 ml HDPE	4°C
Solids, Volatile (VS)	EPA 160.4	7	200	500 ml HDPE	4°C
Solids, Settleable (SS)	EPA 160.5	48 hours	1000	1 L HDPE	4°C
Solids, Volatile Suspended (VSS)	EPA 160.4	7	200	500 ml HDPE	4°C
Specific Conductance	EPA 120.1	ASAP (24 hours)	50	125 ml HDPE	4°C
Sulfate	EPA 300.0/375.4	28	50	125 ml HDPE	4°C
Sulfide, Soluble	EPA 376.2	ASAP	100	125 ml HDPE	NaOH + AlCl3*, 4°C
Sulfide, Total	EPA 376.2	7	50	250 ml HDPE	$ZnAc_2$ & NaOH, 4°C
Surfactants (MBAS)	EPA 425.1	48 hours	200	500 ml HDPE	4°C
Thiosulfate (S_2O_3)	LACSD 253A	24 hours	200	500 ml HDPE	4°C
Total Organic Carbon (TOC)	EPA 415.1	28	40	40 ml VOA vial	H2SO4 / 4°C
Turbidity	EPA 180.1	48 hours	100	125 ml HDPE	4°C
* after flocullation, clear liquid needs to be transferred and preserved w/ NaOH + Zn Ac2.					

Metals	Method	Holding Time (days)	Minimum Volume (mL)	Container	Preservation
Mercury	EPA 245.1/7470A	28	100	250 ml HDPE	HNO_3
ICP Metals	EPA 6010B/200.7	180	100	250 ml HDPE	HNO_3
ICP/MS Metals	EPA 6020/200.8	180	100	250 ml HDPE	Ultra HNO_3
Sodium	EPA 273.1 / 7770	180	100	250 ml HDPE	HNO_3
Potasium	EPA 258.1 / 7610	180	100	250 ml HDPE	HNO_3
Note: Dissolved Metals must be filtered prior to preservation.					
CA Emergent Chemicals	**Method**	**Holding Time (days)**	**Minimum Volume (mL)**	**Container**	**Preservation**
1,4-Dioxane	GC/MS Isotope Dilution	7	1000	1 L amber glass	4°C
Perchlorate	EPA 314.0	28	50	125 ml HDPE	4°C
1,2,3-TCP	EPA 8260B	14**	40	3 x 40 ml VOA vials	HCl, 4°C
** 7 days without HCl					

Note: (M) indicates modification of the method

Appendix H
ATL's Laboratory Certifications

State of California—Health and Human Services Agency
California Department of Public Health

MARK B HORTON, MD, MSPH
Director

ARNOLD SCHWARZENEGGER
Governor

July 11, 2007

Certificate No 2676

PURI ROMUALDO
ADVANCED TECHNOLOGY LABORATORIES - LAS VEGAS
3151-3153 W. POST ROAD
LAS VEGAS, NV 89118

Dear PURI ROMUALDO:

Enclosed is an updated copy of your accreditation papers.

If you have any questions, please contact our office at (510) 620-3155.

Sincerely,

George C. Kulasingam, Ph.D.
Program Chief
Environmental Laboratory Accreditation Program

Enclosure

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Accredited Fields of Testing

ADVANCED TECHNOLOGY LABORATORIES - LAS VEGAS **Lab Phone** (702) 307-2659

3151-3153 W. POST ROAD
LAS VEGAS, NV 89118

Certificate No: 2676 **Renew Date: 06/30/2008** **INTERIM**

Field of Testing: 103 - Toxic Chemical Elements of Drinking Water				
103.310	001	Chromium (VI)	EPA 218.6	Interim
Field of Testing: 108 - Inorganic Chemistry of Wastewater				
108.020	001	Conductivity	EPA 120.1	Interim
108.110	001	Turbidity	EPA 180.1	Interim
108.112	001	Boron	EPA 200.7	Interim
108.120	001	Bromide	EPA 300.0	Interim
108.120	002	Chloride	EPA 300.0	Interim
108.120	003	Fluoride	EPA 300.0	Interim
108.120	004	Nitrate	EPA 300.0	Interim
108.120	005	Nitrite	EPA 300.0	Interim
108.120	006	Nitrate-nitrite	EPA 300.0	Interim
108.120	007	Phosphate, Ortho	EPA 300.0	Interim
108.120	008	Sulfate	EPA 300.0	Interim
108.390	001	Turbidity	SM2130B	Interim
108.430	001	Conductivity	SM2510B	Interim
108.440	001	Residue, Total	SM2540B	Interim
108.441	001	Residue, Filterable	SM2540C	Interim
108.442	001	Residue, Non-filterable	SM2540D	Interim
108.448	001	Bromide	SM4110B	Interim
108.448	002	Chloride	SM4110B	Interim
108.448	003	Fluoride	SM4110B	Interim
108.448	004	Nitrate	SM4110B	Interim
108.448	005	Nitrite	SM4110B	Interim
108.448	006	Nitrate-nitrite	SM4110B	Interim
108.448	007	Phosphate, Ortho	SM4110B	Interim
108.448	008	Sulfate	SM4110B	Interim
108.490	001	pH	SM4500-H+ B	Interim
Field of Testing: 109 - Toxic Chemical Elements of Wastewater				
109.010	001	Aluminum	EPA 200.7	Interim
109.010	002	Antimony	EPA 200.7	Interim
109.010	003	Arsenic	EPA 200.7	Interim
109.010	004	Barium	EPA 200.7	Interim
109.010	005	Beryllium	EPA 200.7	Interim
109.010	007	Cadmium	EPA 200.7	Interim
109.010	009	Chromium	EPA 200.7	Interim

As of 07/11/2007 , this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

109.010	010	Cobalt	EPA 200.7	Interim
109.010	011	Copper	EPA 200.7	Interim
109.010	012	Iron	EPA 200.7	Interim
109.010	013	Lead	EPA 200.7	Interim
109.010	015	Manganese	EPA 200.7	Interim
109.010	016	Molybdenum	EPA 200.7	Interim
109.010	017	Nickel	EPA 200.7	Interim
109.010	019	Selenium	EPA 200.7	Interim
109.010	021	Silver	EPA 200.7	Interim
109.010	023	Thallium	EPA 200.7	Interim
109.010	026	Vanadium	EPA 200.7	Interim
109.010	027	Zinc	EPA 200.7	Interim
109.104	001	Chromium (VI)	EPA 218.6	Interim
109.430	001	Aluminum	SM3120B	Interim
109.430	002	Antimony	SM3120B	Interim
109.430	003	Arsenic	SM3120B	Interim
109.430	004	Barium	SM3120B	Interim
109.430	005	Beryllium	SM3120B	Interim
109.430	007	Cadmium	SM3120B	Interim
109.430	009	Chromium	SM3120B	Interim
109.430	010	Cobalt	SM3120B	Interim
109.430	011	Copper	SM3120B	Interim
109.430	012	Iron	SM3120B	Interim
109.430	013	Lead	SM3120B	Interim
109.430	015	Manganese	SM3120B	Interim
109.430	016	Molybdenum	SM3120B	Interim
109.430	017	Nickel	SM3120B	Interim
109.430	019	Selenium	SM3120B	Interim
109.430	021	Silver	SM3120B	Interim
109.430	023	Thallium	SM3120B	Interim
109.430	024	Vanadium	SM3120B	Interim
109.430	025	Zinc	SM3120B	Interim

Field of Testing: 114 - Inorganic Chemistry of Hazardous Waste

114.010	001	Antimony	EPA 6010B	Interim
114.010	002	Arsenic	EPA 6010B	Interim
114.010	003	Barium	EPA 6010B	Interim
114.010	004	Beryllium	EPA 6010B	Interim
114.010	005	Cadmium	EPA 6010B	Interim
114.010	006	Chromium	EPA 6010B	Interim
114.010	007	Cobalt	EPA 6010B	Interim
114.010	008	Copper	EPA 6010B	Interim
114.010	009	Lead	EPA 6010B	Interim
114.010	010	Molybdenum	EPA 6010B	Interim

114.010	011	Nickel	EPA 6010B	Interim
114.010	012	Selenium	EPA 6010B	Interim
114.010	013	Silver	EPA 6010B	Interim
114.010	014	Thallium	EPA 6010B	Interim
114.010	015	Vanadium	EPA 6010B	Interim
114.010	016	Zinc	EPA 6010B	Interim
114.106	001	Chromium (VI)	EPA 7199	Interim
Field of Testing: 116 - Volatile Organic Chemistry of Hazardous Waste				
116.030	001	Gasoline-range Organics	EPA 8015B	Interim
116.040	041	Methyl tert-butyl Ether (MTBE)	EPA 8021B	Interim
116.040	062	BTEX	EPA 8021B	Interim
116.080	000	Volatile Organic Compounds	EPA 8260B	Interim
116.080	120	Oxygenates	EPA 8260B	Interim
Field of Testing: 117 - Semi-volatile Organic Chemistry of Hazardous Waste				
117.010	001	Diesel-range Total Petroleum Hydrocarbons	EPA 8015B	Interim

ndep
NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
protecting the future for generations

STATE OF NEVADA
Department of Conservation & Natural Resources
DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor
Allen Biaggi, Director
Leo M. Drozdoff, P.E., Administrator

July 31, 2007

ADVANCED TECHNOLOGY LAB-LAS VEGAS
3151 W. Post Rd
LAS VEGAS, NV 89118

RE: Environmental Laboratory Certification Extension.

Dear ADVANCED TECHNOLOGY LAB-LAS VEGAS:

Your laboratory is paid in full for the FY07 (August 1, 2006-July 31, 2007) and your certification has been **extended**.

Either your FY06 (August 1, 2005-July 31, 2006) scope or your FY07 (August 1, 2006-July 31, 2007) scope is in effect until receipt of your FY08 (August 1, 2007-July 31, 2008) scope and certificate from the State of Nevada; Department of Conservation and Natural Resources; Division of Environmental Protection.. However, your continued certification is dependent on receipt of your FY08 application.

This will serve as notice to you and your clients.

If you or your clients have any questions please contact Donald LaFara at 775-687-9491.

Sincerely,

Don LaFara

Donald LaFara, Program Manager
Environmental Laboratory Services

Appendix I
Fax Cover Page

State of Nevada
Department of Conservation and Natural Resources
Division of Environmental Protection
Bureau of Water Quality Planning
Laboratory Scope of Accreditation

EPA Number: ***NV-00922***

Advanced Technology Laboratory
3151 W. Post Road

Las Vegas, NV 89118-

Attachment to Certificate Number: NV-009222007A Expiration Date: 7/31/2007

Method	Analyte	Discipline	Status
Matrix: *SDWA (potable)*			
218.6	Hexavalent Chromium	Chemistry	Interim

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Method	Analyte	Discipline	Status
Matrix: *CWA (non-potable)*			
180.1	Turbidity	Chemistry	Interim
200.7	Aluminum	Chemistry	Interim
200.7	Antimony	Chemistry	Interim
200.7	Arsenic	Chemistry	Interim
200.7	Barium	Chemistry	Interim
200.7	Beryllium	Chemistry	Interim
200.7	Boron	Chemistry	Interim
200.7	Cadmium	Chemistry	Interim
200.7	Chromium	Chemistry	Interim
200.7	Cobalt	Chemistry	Interim
200.7	Copper	Chemistry	Interim
200.7	Iron	Chemistry	Interim
200.7	Lead	Chemistry	Interim
200.7	Manganese	Chemistry	Interim
200.7	Molybdenum	Chemistry	Interim
200.7	Nickel	Chemistry	Interim
200.7	Selenium	Chemistry	Interim
200.7	Silver	Chemistry	Interim
200.7	Thallium	Chemistry	Interim
200.7	Vanadium	Chemistry	Interim
200.7	Zinc	Chemistry	Interim
2130B	Turbidity	Chemistry	Interim
218.6	Hexavalent Chromium	Chemistry	Interim
2510B	Conductivity	Chemistry	Interim
2540B	Residue Total	Chemistry	Interim

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Method	Analyte	Discipline	Status
Matrix: *CWA (non-potable)*			
2540C	Residue Filterable	Chemistry	Interim
300.0	Bromide	Chemistry	Interim
300.0	Chloride	Chemistry	Interim
300.0	Fluoride	Chemistry	Interim
300.0	Nitrate-N	Chemistry	Interim
300.0	Nitrate-Nitrite as N	Chemistry	Interim
300.0	Nitrite-N	Chemistry	Interim
300.0	Ortho-phosphate	Chemistry	Interim
300.0	Sulfate	Chemistry	Interim
4500-H+ B	Hydrogen ion (pH)	Chemistry	Interim

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Method	Analyte	Discipline	Status
Matrix: *RCRA (non-potable)*			
6010B	Aluminum	Chemistry	Interim
6010B	Antimony	Chemistry	Interim
6010B	Arsenic	Chemistry	Interim
6010B	Barium	Chemistry	Interim
6010B	Beryllium	Chemistry	Interim
6010B	Cadmium	Chemistry	Interim
6010B	Chromium	Chemistry	Interim
6010B	Cobalt	Chemistry	Interim
6010B	Copper	Chemistry	Interim
6010B	Lead	Chemistry	Interim
6010B	Manganese	Chemistry	Interim
6010B	Molybdenum	Chemistry	Interim
6010B	Nickel	Chemistry	Interim
6010B	Selenium	Chemistry	Interim
6010B	Silver	Chemistry	Interim
6010B	Thallium	Chemistry	Interim
6010B	Vanadium	Chemistry	Interim
6010B	Zinc	Chemistry	Interim
7199	Cr-VI	Chemistry	Interim
8015M	Gasoline Range Organics	Chemistry	Interim
8021B	Benzene	Chemistry	Interim
8021B	Ethylbenzene	Chemistry	Interim
8021B	m + p Xylene	Chemistry	Interim
8021B	Methyl t-butyl ether (MTBE)	Chemistry	Interim
8021B	o-Xylene	Chemistry	Interim

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Method	Analyte	Discipline	Status
Matrix: *RCRA (non-potable)*			
8021B	Toluene	Chemistry	Interim
8260B	1,1,1,2-Tetrachloroethane	Chemistry	Interim
8260B	1,1,1-Trichloroethane	Chemistry	Interim
8260B	1,1,2,2-Tetrachloroethane	Chemistry	Interim
8260B	1,1,2-Trichloroethane	Chemistry	Interim
8260B	1,1-Dichloroethane	Chemistry	Interim
8260B	1,1-Dichloroethene	Chemistry	Interim
8260B	1,2,3-Trichloropropane (TCP)	Chemistry	Interim
8260B	1,2,4-Trichlorobenzene	Chemistry	Interim
8260B	1,2-Dibromo-3-chloropropane (DBCP)	Chemistry	Interim
8260B	1,2-Dibromoethane (EDB)	Chemistry	Interim
8260B	1,2-Dichlorobenzene	Chemistry	Interim
8260B	1,2-Dichloroethane	Chemistry	Interim
8260B	1,2-Dichloropropane	Chemistry	Interim
8260B	1,3-Dichlorobenzene	Chemistry	Interim
8260B	1,4-Dichlorobenzene	Chemistry	Interim
8260B	2-Butanone (MEK)	Chemistry	Interim
8260B	2-Chloroethanol	Chemistry	Interim
8260B	2-Chloroethyl vinyl ether	Chemistry	Interim
8260B	2-Hexanone	Chemistry	Interim
8260B	4-Methyl-2-pentanone (MIBK)	Chemistry	Interim
8260B	Acetone	Chemistry	Interim
8260B	Acrolein	Chemistry	Interim
8260B	Acrylonitrile	Chemistry	Interim
8260B	Benzene	Chemistry	Interim

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Matrix: *RCRA (non-potable)*			
8260B	Bromodichloromethane	Chemistry	Interim
8260B	Bromoform	Chemistry	Interim
8260B	Bromomethane	Chemistry	Interim
8260B	Carbon disulfide	Chemistry	Interim
8260B	Carbon tetrachloride	Chemistry	Interim
8260B	Chlorobenzene	Chemistry	Interim
8260B	Chloroethane	Chemistry	Interim
8260B	Chloroform	Chemistry	Interim
8260B	Chloromethane	Chemistry	Interim
8260B	cis-1,2-Dichloroethene	Chemistry	Interim
8260B	cis-1,3-Dichloropropene	Chemistry	Interim
8260B	Dibromomethane	Chemistry	Interim
8260B	Dichlorodifluoromethane	Chemistry	Interim
8260B	Ethylbenzene	Chemistry	Interim
8260B	Hexachlorobutadiene	Chemistry	Interim
8260B	Isopropyl ether (DIPE)	Chemistry	Interim
8260B	Methyl t-butyl ether (MTBE)	Chemistry	Interim
8260B	Methylene chloride (Dichloromethane)	Chemistry	Interim
8260B	Naphthalene	Chemistry	Interim
8260B	Styrene	Chemistry	Interim
8260B	t-Butyl alcohol (TBA)	Chemistry	Interim
8260B	t-Butyl ethyl ether (ETBE)	Chemistry	Interim
8260B	Tetrachloroethene	Chemistry	Interim
8260B	Toluene	Chemistry	Interim
8260B	Total xylenes	Chemistry	Interim

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Matrix: *RCRA (non-potable)*			
8260B	trans-1,2-Dichloroethene	Chemistry	Interim
8260B	trans-1,3-Dichloropropene	Chemistry	Interim
8260B	Trichloroethene	Chemistry	Interim
8260B	Trichlorofluoromethane	Chemistry	Interim
8260B	Vinyl acetate	Chemistry	Interim
8260B	Vinyl Chloride	Chemistry	Interim

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Matrix: *RCRA (soil)*			
6010B	Aluminum	Chemistry	Interim
6010B	Antimony	Chemistry	Interim
6010B	Arsenic	Chemistry	Interim
6010B	Barium	Chemistry	Interim
6010B	Beryllium	Chemistry	Interim
6010B	Cadmium	Chemistry	Interim
6010B	Chromium	Chemistry	Interim
6010B	Cobalt	Chemistry	Interim
6010B	Copper	Chemistry	Interim
6010B	Lead	Chemistry	Interim
6010B	Molybdenum	Chemistry	Interim
6010B	Nickel	Chemistry	Interim
6010B	Selenium	Chemistry	Interim
6010B	Silver	Chemistry	Interim
6010B	Thallium	Chemistry	Interim
6010B	Vanadium	Chemistry	Interim
6010B	Zinc	Chemistry	Interim
7199	Cr-VI	Chemistry	Interim
8015B	Diesel Range Organics	Chemistry	Interim
8015M	Gasoline Range Organics	Chemistry	Interim
8021B	Benzene	Chemistry	Interim
8021B	Ethylbenzene	Chemistry	Interim
8021B	m + p Xylene	Chemistry	Interim
8021B	Methyl t-butyl ether (MTBE)	Chemistry	Interim
8021B	Toluene	Chemistry	Interim

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Matrix: *RCRA (soil)*			
8260B	1,1,1,2-Tetrachloroethane	Chemistry	Interim
8260B	1,1,1-Trichloroethane	Chemistry	Interim
8260B	1,1,2,2-Tetrachloroethane	Chemistry	Interim
8260B	1,1,2-Trichloroethane	Chemistry	Interim
8260B	1,1-Dichloroethane	Chemistry	Interim
8260B	1,1-Dichloroethene	Chemistry	Interim
8260B	1,2,3-Trichloropropane (TCP)	Chemistry	Interim
8260B	1,2-Dibromo-3-chloropropane (DBCP)	Chemistry	Interim
8260B	1,2-Dibromoethane (EDB)	Chemistry	Interim
8260B	1,2-Dichlorobenzene	Chemistry	Interim
8260B	1,2-Dichloroethane	Chemistry	Interim
8260B	1,2-Dichloropropane	Chemistry	Interim
8260B	1,3-Dichlorobenzene	Chemistry	Interim
8260B	1,4-Dichlorobenzene	Chemistry	Interim
8260B	2-Butanone (MEK)	Chemistry	Interim
8260B	2-Hexanone	Chemistry	Interim
8260B	4-Methyl-2-pentanone (MIBK)	Chemistry	Interim
8260B	Acetone	Chemistry	Interim
8260B	Benzene	Chemistry	Interim
8260B	Bromoform	Chemistry	Interim
8260B	Bromomethane	Chemistry	Interim
8260B	Carbon disulfide	Chemistry	Interim
8260B	Carbon tetrachloride	Chemistry	Interim
8260B	Chlorobenzene	Chemistry	Interim
8260B	Chloroethane	Chemistry	Interim

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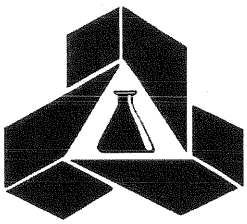
Matrix: *RCRA (soil)*			
8260B	Chloroform	Chemistry	Interim
8260B	Chloromethane	Chemistry	Interim
8260B	cis-1,2-Dichloroethene	Chemistry	Interim
8260B	cis-1,3-Dichloropropene	Chemistry	Interim
8260B	Dibromochloromethane	Chemistry	Interim
8260B	Dibromomethane	Chemistry	Interim
8260B	Dichlorodifluoromethane	Chemistry	Interim
8260B	Ethylbenzene	Chemistry	Interim
8260B	Methyl t-butyl ether (MTBE)	Chemistry	Interim
8260B	Methylene chloride (Dichloromethane)	Chemistry	Interim
8260B	Styrene	Chemistry	Interim
8260B	Tetrachloroethene	Chemistry	Interim
8260B	Toluene	Chemistry	Interim
8260B	Total xylenes	Chemistry	Interim
8260B	trans-1,2-Dichloroethene	Chemistry	Interim
8260B	trans-1,3-Dichloropropene	Chemistry	Interim
8260B	Trichloroethene	Chemistry	Interim
8260B	Trichlorofluoromethane	Chemistry	Interim
8260B	Vinyl acetate	Chemistry	Interim
8260B	Vinyl Chloride	Chemistry	Interim



Advanced Technology
Laboratories

3151 W. Post Rd.
Las Vegas, NV 89118
(702) 307-2659 Phone
(702) 307-2691 Fax

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